The University of Jordan

Authorization Form

I, Hotaf Hamed Yassien , authorize the University of Jordan to supply copies of my Thesis/ Dissertation to libraries or establishments or individuals on request, according to the University of Jordan regulations.

Signature:

Date: 30 / 11 / 2011

الجامعة الأردنية
كلية الدراسات العليا

التاريخ: / /

نموذج رقم (١٨)
اقرار والتزام بالمعايير الأخلاقية والأمانة العلمية
وقوانين الجامعة الأردنية وأنظمتها وتعليماتها
لطلبة الماجستير

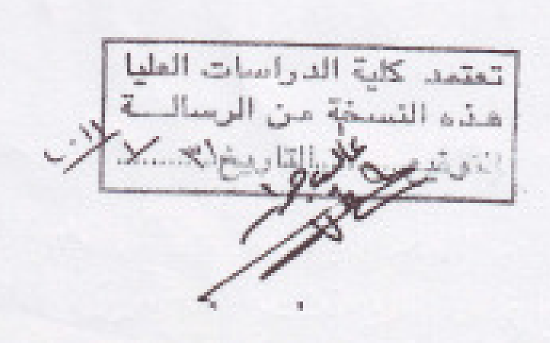
أنا الطالب: حنان حامد سا سنيم الرقم الجامعي: (٨٠٩٠٩٠٢)

تخصص: إدارة مصادر المياه المتكاملة الكليــة: العلوم

عنوان الرسالة: تصميم النظام الخبير البيئي كأداة لحماية جودة المياه الجوفية من الأنشطة البشرية في منطقة ...

اعلن بأنني قد التزمت بقوانين الجامعة الأردنية وأنظمتها وتعليماتها وقراراتها السارية المفعول المتعلقة باعداد رسائل الماجستير عندما قمت شخصيا" باعداد رسالتي وذلك بما ينسجم مع الأمانة العلمية وكافة المعايير الأخلاقية المتعارف عليها في كتابة الرسائل العلمية. كما أنني أعلن بأن رسالتي هذه غير منقولة أو مستلة من رسائل أو كتب أو أبحاث أو أي منشورات علمية تم نشرها أو تخزينها في أي وسيلة اعلامية، وتأسيسا" على ما تقدم فانني أتحمل المسؤولية بأنواعها كافة فيما لو تبين غير ذلك بما فيه حق مجلس العمداء في الجامعة الأردنية بالغاء قرار منحي الدرجة العلمية التي حصلت عليها وسحب شهادة التخرج مني بعد صدورها دون أن يكون لي أي حق في التظلم أو الاعتراض أو الطعن بأي صورة كانت في القرار الصادر عن مجلس العمداء بهذا الصدد.

توقيع الطالب: .... التاريخ: ٢٠ / ١ / ٢٠١١



INTRODUCING THE BLUE FLAG ECO-LABEL AS AN INSTRUMENT FOR CONSERVING THE COASTAL ZONE FROM LAND-BASED ACTIVITIES IN THE GULF OF AQABA

By
Hotaf Yassien

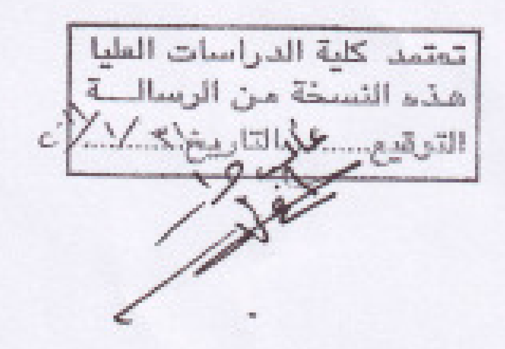
Supervisor
Dr.Arwa Hamaideh

Co-Supervisor
Dr.Udo Nehren

Submitted in Partial Fulfillment of the Requirements for the Degree of Master in Integrated Water Resources Management

Faculty of Graduate Studies
University of Jordan

January, 2011



INTRODUCING THE BLUE FLAG ECO-LABEL AS AN INSTRUMENT FOR CONSERVING THE COASTAL ZONE FROM LAND-BASED ACTIVITIES IN THE GULF OF AQABA

By
Hotaf Yassien

Supervisor
Dr.Arwa Hamaideh

Co-Supervisor
Dr.Udo Nehren

Submitted in Partial Fulfillment of the Requirements for the Degree of Master in Integrated Water Resources Management

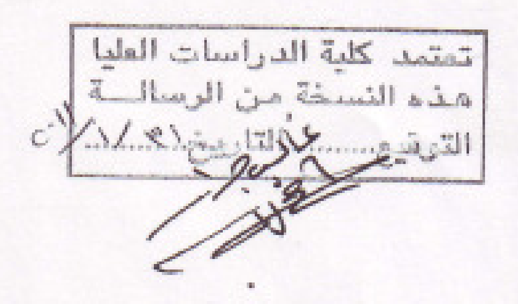
Faculty of Graduate Studies
University of Jordan

January, 2011

COMMITTEE DECISION

This Thesis/Dissertation (Introducing The Blue Flag Eco-Label As An Instrument For Conserving The Coastal Zone From Land-Based Activities In The Gulf of Aqaba) was Successfully Defended and Approved on 19/1/2010

Examination Committee	**Signature**
Dr. Arwa Hamaideh, (Supervisor Assist. Res. Integrated Water Resources Management	----------------------------
Dr.Udo Nehren, (Co- Supervisor) Prof. of Landscape Ecology	----------------------------
Dr. Amer Salman, (Member) Prof. of Water Economics	----------------------------
Dr. Omar Kafawin, (Member) Prof. of Plant Breeding and Genetics	----------------------------
Dr. Saad AlAyyash, (Member) Assist. Res. of Water Resources Engineering	----------------------------



Acknowledgment

I would like to express my deepest appreciation and gratitude to Dr. Arwa Hamaideh and Dr. Udo Nehren for supervising this study and for their valuable comments, suggestions, great effort, and constructive discussions and also for their continuous support and encouragement.

I acknowledge the German Academic Exchange Service (DAAD) for their financial support during the time of my studying in the bi-cultural master program Integrated Water Resources Management (IWRM).

I am very thankful to my family and friends who supported me during the time of my research. In addition, I would like to thank the team of the Royal Marine Conservation Society of Jordan (JREDS), Aqaba Special Economic Zone Authority (ASEZA), and other institutions and organizations for providing valuable advices and giving the needed information.

Table of Contents

List of Figures

List of Tables

List of Maps

List of Abbreviations

ADC	Aqaba Development Cooperation
AGR	Aqaba Gulf Region
ASEZ	Aqaba Special Zone
ASEZA	Aqaba Special Economic Zone Authority
AWWTP	Aqaba wastewater treatment plant
DOS	Department of Statistics
E.coli	Escherichiacoli
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EPA	Environmental Protection Agency
ESD	Education for Sustainable Development
EU	European Union
EUCC	European Union for Coastal Conservation
FEE	Foundation for Environmental Education
GDP	Gross Domestic Product
GEN	Global Eco-labeling Network
GWP	Global Water Partnership
ICOMIA	International Council of Marine Industry Association
ICZM	Integrated Coastal Zone Management
ILS	International Life Saving Federation
ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resources Management
JAS	Jordan Accreditation System
JISM	Jordanian Institution for Standards and Metrology
JREDS	The Royal Marine Conservation Society of Jordan

KPIs	Key Performance Indicators
MoE	Ministry of Environment
MoTA	Ministry of Tourism and Antiquities
MSS	Marine Science Station
NGO	Non-Governmental Organization
NPA	National Program of Action
PERSGA	Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
R.C.A	Republic of South Africa
RCE	Regional Center of Expertise
SWEDAC	Swedish Board for Accreditation and Conformity Assessment
UNEP	United Nation Environment Program
USAID	United State Agency for International Development
WHO	World Health Organization
WTO	World Tourism Organization

List of Units

C	Celsius
cfu	colony forming unit
cm	centimeter
km	kilometer
m^2	square meter
m^3	cubic meter
MCM	Million Cubic Meters
mm	millimeter
ppt	parts per thousand

INTRODUCING THE BLUE FLAG ECO-LABEL AS AN INSTRUMENT FOR CONSERVING THE COASTAL ZONE FROM LAND-BASED ACTIVITIES IN THE GULF OF AQABA

By
Hotaf Yassien

Supervisor
Dr.Arwa Hamaideh

Co-Supervisor
Dr.Udo Nehren

Abstract

Aqaba's coastline is undergoing a steadily increasing economic development, notably in tourism sector. This has considerable effects on the environment and therefore requires special attention in the Integrated Coastal Zone Management. The Blue Flag Program, run by the non-profit and non-governmental Foundation for Environmental Education (FEE), awards an internationally recognized eco-label for beaches and marinas. The program focuses on working towards sustainable development in coastal environments through strict criteria, covering the four categories of water quality, environmental education, environmental management, and safety.

This study aims at introducing the Blue Flag Program in Jordan through depicting the parties that would possibly be involved in its implementation in Aqaba. Furthermore, applied Jordanian standards and local framework conditions are evaluated at two exemplary beaches covering both, private and public beaches regarding their compliance to requested Blue Flag criteria. Special focus is laid on bathing water quality of the concerned areas.

To gain first hand information from the possible stakeholders, semi structured interviews have been conducted. Field observations on the selected beaches were chosen in order to complement the empirical approach providing an insight view. In addition, a questionnaire has been distributed targeting private beach users at five stars hotels. Analysis of the questionnaire has been done by using Statistical Package for the Social Science (SPSS) program.

The research showed that private beaches are in far better conditions than public beaches. Main constraints for the Blue Flag implementation at public beaches are of financial nature. However, cost reduction could be achieved by not simply adding new but actually reviewing current sampling procedures, and focusing on avoidance of unrequested tests.

In the context of this study a "sampling form" has been developed as an inexpensive bathing water monitoring tool. This form has already been adopted by ASEZA and supplements expensive testing and thereby reduces sampling costs.

The conducted questionnaire revealed that the sole appearance of an eco-label is highly attractive to tourists. Although they were not informed about the Blue Flag's criteria and regulations, the vast majority of questioned tourists expressed their preference of eco-label awarded beaches to classical beaches, especially international tourists.
Furthermore, the results of the conducted questionnaire stated that the majority of private beach users are willing to pay an additional eco-tax on a daily basis.
The study recommends utilizing the possibly collected eco-tax for financing investments needed to enhance compliance of public beaches to Blue Flag standards.

Introduction

1.1. Background

Jordan is a small country with an area of 89,400 km^2 (DOS, 2007) and limited scarce natural resources. The Jordanian shoreline of the Gulf of Aqaba is only 27 km long and thus demarcates a relatively small and enclosed water body (Tortell, 2004). Nevertheless, it hosts a very unique marine environment with an extraordinary biodiversity of coral reefs and related aquatic life.

The Gulf of Aqaba is shared by four countries, namely Jordan, Israel, Egypt, and Saudi Arabia. It represents the only coastal area and sea port in Jordan. The port of Aqaba is well known as an industrial center where bulks of phosphate form the main export. A wide range of worldwide products enter the country via this harbor (Al-Husseini, 2001).

Until 1960, Aqaba as a city with its Gulf was relatively unaffected by development. In the year 2001, and under the patronage of His Majesty King Abdullah II, Aqaba with all its human and natural resources was prepared for being transformed into a world-class Red Sea business hub and leisure destination (ASEZA, 2001).

The Aqaba Special Economic Zone (ASEZ) was established and governed by an autonomous authority (ASEZA), which is considered as independent authority acting under the umbrella of the Jordanian government. Since then, the Gulf of Aqaba has become a strategic international asset, with major industrial facilities, shipping activities, and a rapidly expanding tourism industry which depends on a high quality environment inventory.

Recently, the Jordanian coast is undergoing a steadily increasing economic development, notably in the tourism sector. Around 550,000 tourists visited the Gulf of Aqaba in 1996 (Alawneh and Lhier, 2006) and according an estimation based on a study carried out by United State Agency for International Development (USAID) in 2009 more than 4 million

are expected for the year 2018. Thereby, drastically increasing touristic activities could result in a real threat to the Gulf's natural system and the conservation of its marine life.

Keeping the balance and promoting an environmentally sustainable use of marine resources is the key element for ensuring long term economic benefits and sustainable development. This could be achieved by sound planning and Integrated Coastal Zone Management (ICZM).

Implementing environmental programs and introducing environmental awards functioning as incentives, represent the best management practices which enhance the idea of sustainable use of the natural resources (Michael, et al., 2005).

In this context, the Blue Flag Program poses an example of an incentive tool for facilitating coastal zone management. The priority of this internationally recognized program focuses on working towards sustainable development at beaches and marinas. Thereto, precise criteria have been formulated covering four categories of water quality, environmental education, environmental management, and safety (FEE, 2006). The Blue Flag became a synonym of hygienic, safe, environmentally friendly, and well managed beaches. Accordingly, many tourists are asking particularly for vacation destinations awarded with the Blue Flag Tag (Aliraja and Rughooputh, 2004).

1.2. Objectives of the study

The long term objective is to establish the Blue Flag Award for enhancing the sustainable development of an expected increased touristic sector. This study attempts to serve this overall objective by introducing the idea of the Blue Flag eco-label as an instrument for protecting the coastal zone of Aqaba from negative impacts of increased tourism. Furthermore, assess the economic and environmental potential of its implementation. The requested Blue Flag criteria shall be illustrated while taking similarities to Jordanian standards into consideration. Moreover, local framework concerning water quality of the specific researched areas and applicability under local conditions are respected.

In addition, the perception of possible stakeholders towards the Blue Flag eco-label shall be appraised which includes the evaluation of the willingness of private beaches users to pay an additional eco-tax. Finally, steps and procedures that need to be taken further for reaching the compliance of the selected beaches to the Blue Flag standards shall be identified.

1.3. Problem Statement

Despite overall positive socio-economic impacts of the tourism industry such as growing employment opportunities for the local population and revenue generation, seasonal and spatial clusters of tourists can have serious impacts on the marine environment. However, this stresses the vulnerable physical environment and precious biodiversity. It is imposing an actual threat to marine life, as well as leading inherently to conflicts between human uses and the marine environment (Laine and Kronholm, 2005). Moreover, positive socio-economic impacts resulting from the marine environment will not endure in the long term if environmental conditions diminish significantly.

The Gulf of Aqaba should be well protected from adverse impacts of the tourism industry. Therefore, the sustainable use of its resources is strongly recommended (UNEP, 2005). In

order to protect the marine environment of the Gulf, a number of significant actions have been taken by Jordan in recent years. Nevertheless, achieving high standards in terms of coastal management is still challenging for ASEZA.

1.4. Justification

The natural environment of the Gulf of Aqaba is important and significant, especially regarding its unique marine flora and fauna, and valuable terrestrial habitats.

Recently, the coast is exposed to various environmental stresses due to continued urban development and tourism activities which may impact the nature of the physical environment and the biodiversity of the Gulf (NPA, 2008). Therefore, it is very crucial to keep all the economic developments (with special focus on the tourism industry) remaining environmentally sustainable in the long term. The environmental resources of the area concerned represent an integral element of its attraction to investment. The share of the coast in the Gross Domestic Product (GDP) represents 4% of the total of Jordan's GDP in 2006 (Alawneh and Lhier, 2006).

Comparing the current situation of the Jordanian coastline and its beaches with the Blue Flag criteria will provide the opportunity for the local authority to evaluate their actual policy and standards in terms of conserving the marine environment and promoting the coastal zone on an international level. The identification of limiting factors will allow addressing important issues preparing the ground for a possible implementation of the program.

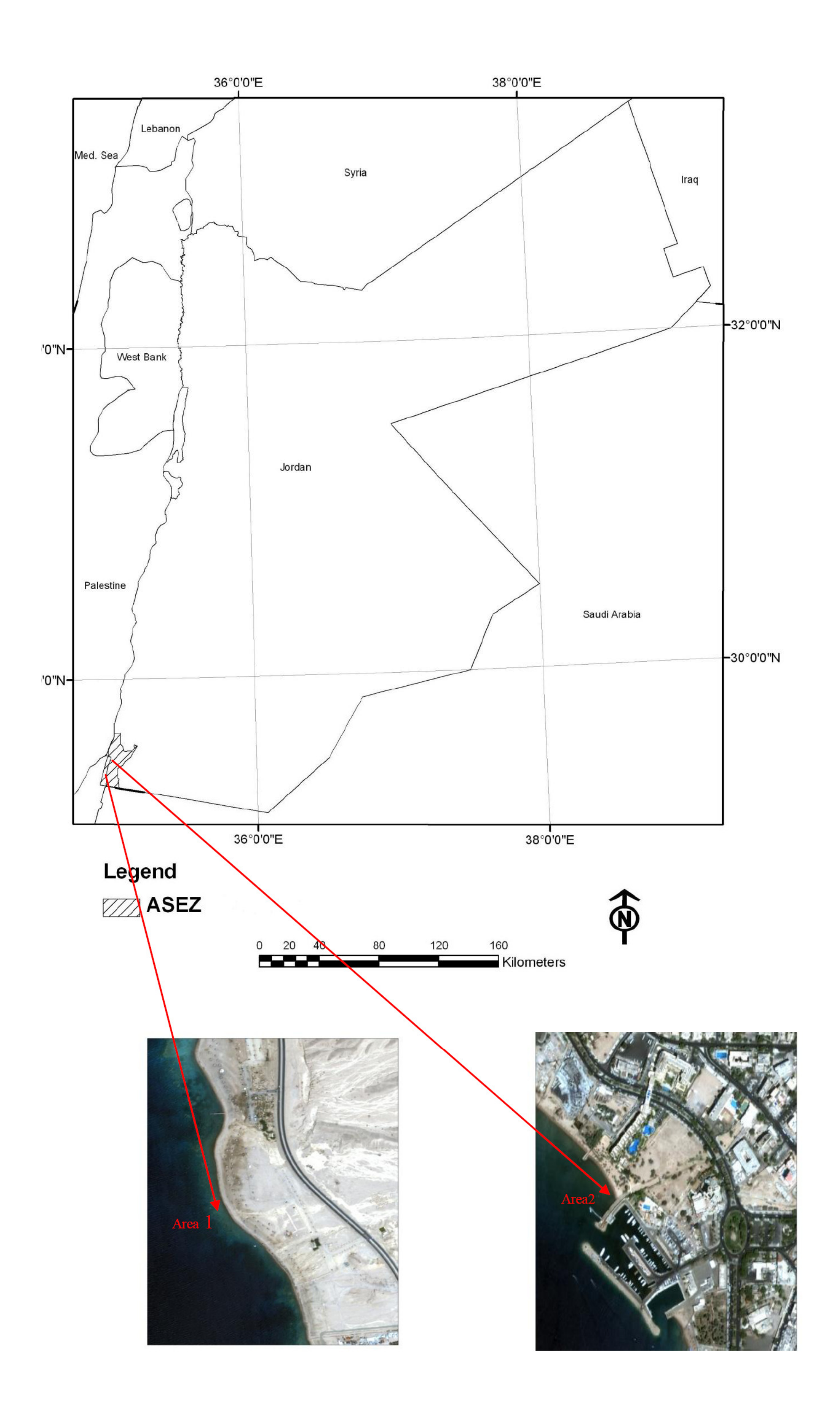
Study Area

1.1. Geographical location

Aqaba city is situated at the north eastern tip of the Gulf of Aqaba and at the south-western most part of Jordan, around 340 km from Amman. The Gulf of Aqaba which is located in the northern Red Sea, lies between 34º 57′ longitude and 35º 09′ E and latitude 29º 19′ and 29 º43′ N. The entire Gulf of Aqaba stretches from its northern tip to the Strait of Tiran throughout a total length of about 180 km; its average width is 8 km (Hulings, 1989). Out of this, the Jordanian coastline has a share of 27 km. The marine environment is surrounded by arid land that is characterized by an extreme temperature regime and low levels of precipitation. These extreme conditions have led to the evolution of unique coral reefs and marine ecosystems (Reiss and Hottinger, 1984).

Map 1 shows an overview of Jordan with an illustration of ASEZ. For the purpose of this research, two beaches from different zones along the Jordanian coastline were selected. The first beach, Area 1, represents one of the numerous public beaches. The selected beach has a length of around 300 m and is located in the southern area of the coastline of Aqaba. Meanwhile, the second beach, Area 2, represents one of the private beaches. This beach is around 70 m length and located in the northern part of the coastline of Aqaba.

The selected beaches were chosen to represent two different conditions. The public beach of Area 1 reflects common conditions among other public beaches in terms of facilities and environmental conditions. Public beaches are managed by and under the authority of ASEZA. Contrarily, the beach of Area 2 reflects the conditions of the privately managed beaches in Aqaba.



Map 1: Overview Jordan with Illustration of ASEZ, Picture (left): Study Area 1 represents the selected public beach; Picture (right): Study Area 2 represents the selected private beach
Source: Adopted from ASEZA, 2010

1.2. General Description of Southern Tourism Area

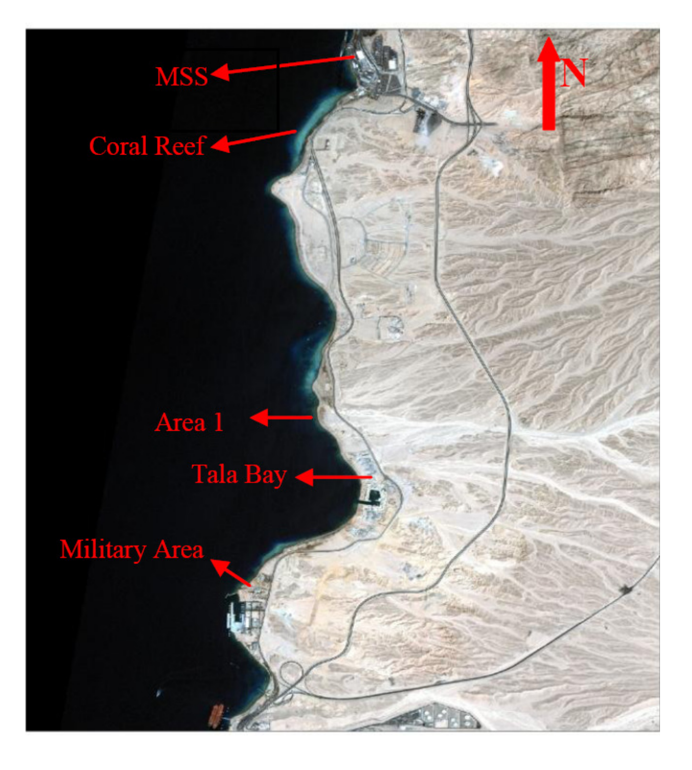
The southern tourism area is around 8 km of the coastline of the Gulf of Aqaba, which starts from the Aqaba Marine Park including Tala Bay resort to north of the oil terminal. The Marine Park is 7 km of the coastline which is considered as protected area by the ASEZA's regulation. Activities which may result in the destruction, damage or deterioration of the marine environment are strictly controlled in this area. The major features of the southern coastline are illustrated by table 1.

Table 1: Characterization of Marine Park and Southern Tourism Area

Approx. Length	Description	Current Characterization
1.2 km	Coral Reserve	This area consisted of the Marine Science Station Research Center (MSS) and restricted coral reserve which is part of the Aqaba Marine Park.
5.4 km	Public Beach	Sandy beach with various facilities, including Murjan Diving Club, Marine Park Offices, Tala Bay Marina and Royal Diving Club.
1.5 km	Royal Naval and Military Area	Restricted area including Military Housing Complex, Royal Naval Base and General Intelligence Housing.

Source: NPA, 2008

Map 2 is an aerial photograph showing the major features in this area. The red arrows indicate the specific features. Thereby, the MSS is shown in the north, while the coral reef reserve appears as greenish stripe. Area 1 represents the investigated public beach that is targeted by local tourists especially at weekends, and during public holidays. Furthermore, the map indicates the location of Tala Bay one of the major resorts of this area. A military area and royal naval base are located in the south of the depicted area.



Map 2: Major Features in the Southern Area; MSS,Coral reef reserve, Study Area 1 represents selected public beach, Tala Bay resort, and Military area
Source: Adopted from GIS division at ASEZA, 2010

1.3. General Description of Northern Tourism Area

The northern tourism area stretches over a length of 4 km, starting from the Israeli border and reaching to the main port including lands which are classified as “Urban Tourism”. Map 3 is an aerial photograph showing the main features in this area. As mentioned before, the red arrows are indicating the location of specific points of interests. Ayla resort, a project still under construction marks the north of the concerned area. Furthermore, Area 2 is shown which represents one of the private beaches belonging to five stars hotels in the hotel zone of this area. Hafayer area represents the area of related public beaches and cafes. The main port is found in the lower part of this aerial photograph and thereby marks the south of the concerned area.

The northern area of the Jordanian coastline of the Gulf of Aqaba is occupied by a number of privately operated hotels; further hotels are under construction including two major big resorts of the Ayla and the Sarya project. Table 2 summarizes the current features of this area.



Map 3: Major Features in the Northern Area; Ayla project, Area 2 represents one of the private beaches in this area, Hafayer area, and Main port
Source: Adopted from GIS division at ASEZA, 2010

Table 2: Characterization of Northern Tourism Area

Approx. Length	Description	Current Characterization
0.3 km	Ayla Resort (under construction)	Tourism resort including marina, and navigation channel
1.1 km	Royal Palace Compound	Natural beachfront, including marine, navigation channel and offshore break-waters.
0.3 km	Royal Yacht Club	Rock-armored marina basin
1.0 km	Hafayer and Arab Revolt Plaza	Beachfront with cafes, and small boat harbor
1.0 km	Hotel Zone	Reformed beachfront for tourist use, and some jetties

Source: NPA, 2008

1.4. Oceanographic and Meteorological Conditions of the Gulf of Aqaba

By the following the oceanographic and meteorological conditions of the Gulf of Aqaba shall be described according to data for the year 2004 from the Marine Science Station (MSS) in Aqaba.

Climate: The climate is arid to semi-arid, with an average annual potential evaporation of about 3,800 mm. The monthly variations of air temperature of the Gulf of Aqaba vary from 17.8ºC to 22.3ºC in winter, 24.1ºC to 31.7ºC in spring and 32.5ºC to 35.7ºC in summer, while temperatures on substrate rocky beaches may fairly exceed 50ºC.

Relative Humidity: In the summer season (May to October), the maximum values of humidity vary from 47.5% to 55.6%, while during the winter season (November to April), the maximum values of humidity vary from 54.6% to 63.5%, representing a relatively high value.

Winds: Prevailing winds mainly blow from north-northwest with occasional winter storms.

Water Temperature and Salinity: The salinity of the Gulf of Aqaba ranges from 40.3 to 41.6 parts per thousand (ppt).Water temperature remains at a constant of 21.5ºC below a depth of 200 meters and varies from 25.5ºC to 27.3ºC in summer and from 22.5ºC to 23.9ºC in winter at the surface.

Rainfall: Rainfall in the Gulf of Aqaba is sparse and varies tremendously in space and time, as it typically applies to arid climates. Rainfall mostly occurs during December, occasionally associated with thunderstorms and in form of short events. In general, Aqaba receives relatively little precipitation ranging from 65 mm/year in the north to less than 45 mm/year in the south.

Water Movement and Currents: The basic movements of water close to the surface of the Gulf's enclosed water body follow the wind pattern in clockwise direction. Therefore,

the northerly wind of summer conveys water southwards, while in winter with occurring southerly winds the flow is reversed, pushing water into the northern Red Sea from its southern part. Currents in the southern part of the Gulf are most affected by strong southerly winds. Oceanic currents in the Indian Ocean normally change the level of the Red Sea and thus, the Gulf of Aqaba being seasonally affected by it, resulting in a magnitude of seasonal sea level variations of approximately 30 cm, apart from generally moderate tides.

Nutrients: Most of the Red Sea water is considered oligotrophic with some exceptions of small areas along the Sinai Peninsula. Water in the Gulf of Aqaba is relatively poor of nutrients compared to other oceans. Most nutrients which enter the sea are anthropogenically induced, some also through natural processes. Anthropogenic inputs originate mainly from contaminated groundwater, sewage discharge, and industrial runoff, while natural sources include nitrogen fixation and decomposition of organic matter. One further significant characteristic is the mixing of water. Vertical water mixing in the Gulf of Aqaba occurs regularly, transferring nutrients from deep water to the upper layers. In winter time deep water mixing and high nutrient concentration are dominant.

1.5. General Information about Aqaba

2.5.1. Population Growth

The growth of population in the Aqaba Governorate and Aqaba city area is one of the most relevant components to be considered in estimating the demand for residential consumption of natural resources and other facilities.

The data presented in Figure 1contains estimations from the Department of Statistics (DOS) for the years 1994 to 2010 and projections from recent reports from ASEZA for the years 2011 to 2020. It reveals that Aqaba experienced and is expect to further experience continuous growth. However, growth rates can vary significantly from one

year to another, which might be related to political instability in neighboring countries and thus the reception of refugees. Furthermore, Aqaba experienced significant population increase in the recent years, as a result of its declaration as special economic zone. Hence, it attracted many people within the country, due to the new economic opportunities offered.

However, the increased number of population living in Aqaba will cause a steadily growing pressure on the natural resources, particularly on the marine environment.

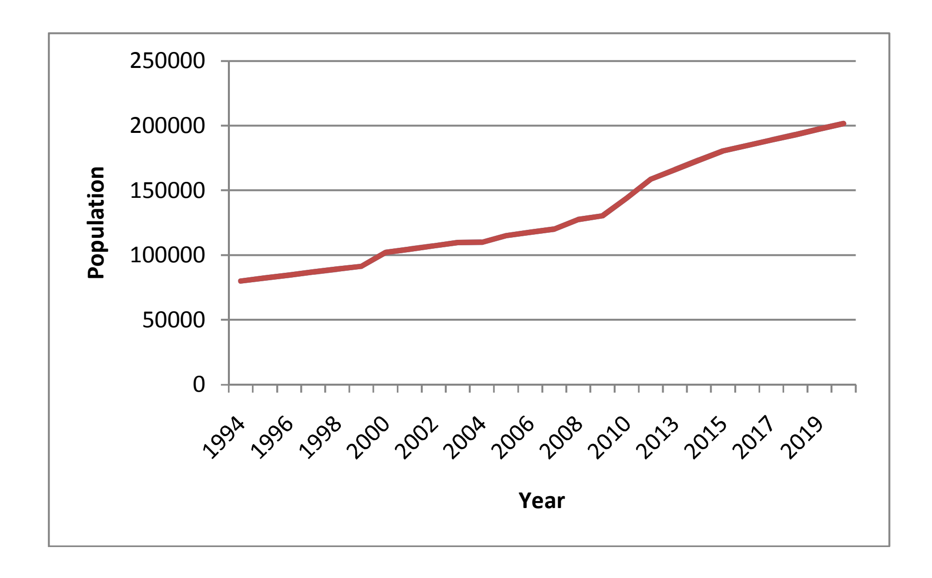


Figure 1: Past and Projected Population Growth in Aqaba from 1994 to 2019
Source: DOS, 2010 and ASEZA, 2010

2.5.2. Water Resources

There are two main water sources: surface water and groundwater. Surface water availability in the Aqaba area is very limited because of high evaporation and high infiltration rates.

Currently, the main source of freshwater in Aqaba city is the nonrenewable Disi-Aquifer, which represents a groundwater body situated within lower Ordovician/Cambrian geological formations. It contains large quantities of fossil water, which is extracted for

satisfying domestic, industrial, commercial, and agricultural water demands of Jordan and Saudi Arabia (USAID, 2007).

2.5.3. Water Consumption and future Water Demand

According to the Water Resources Planning Model Report which has been conducted by USAID (2007), water demands will increase significantly in the future. Moreover, the demand for freshwater in the tourism sector will be one of the largest consumption sectors due to the expected building of new hotels and big resorts along the coastal zone.

Table 3 indicates the amount of freshwater consumed in 2007 by various sectors, as well as freshwater demand forecasts for the years 2007-2020.

Table 3: Summary of Freshwater Demand Forecast Until 2020 [MCM]

Sector	2007	2010	2014	2018	2020	Annual Growth %
Industrial	4.11	6.19	9.93	12.06	12.85	16.4
Residential	3.04	3.27	3.61	3.99	5.16	2.90
Commercial	3.21	3.83	4.12	4.43	4.60	3.30
Tourism	0.38	0.67	1.37	2.00	2.50	42.90
Agriculture	0.03	0.03	0.03	0.04	0.04	2.60
Unaccounted (leakage)	3.45	3.91	5.07	5.83	6.14	6.60

Source: USAID, 2007

2.5.4. Use of Reclaimed Water

The rapid increase of population growth associated with human activities along the coastline generates significant sources of pollution in the coastline of the Gulf of Aqaba. Until 1987, the untreated sewage was discharged directly into the Gulf in the vicinity of the port of Aqaba. Since then, the Aqaba wastewater treatment plant (AWWTP) was established as wastewater stabilization pond with a designed capacity of 9,000 m^3/day of raw sewage. In 2001, AWWTP was upgraded with support from USAID using the activated sludge process that made provision of reclaimed water suitable for various uses possible. The resulting amount of 12,000 m^3/day reclaimed water is shared equally by urban landscape irrigation and urban industrial use (Al-Kailani, 2008).

2.5.5. ASEZ Master Plan

In 2002, ASEZA adopted a comprehensive Master Plan, illustrated in Map 4 which encompasses the development activities in the zone for the promotion of portal, urban, tourist, commercial, academic and investment sectors. This Master Plan aims to preserve the natural resources within certain framing. It comprises several zones and reserves for the sake of protecting Aqaba's cultural, archaeological, historical and geographical natural heritage and diversity. According to the Jordan Report on ICZM in 2004, the planning has been developed in five particular areas as following:

- **Aqaba Town Zone:** Old and new residential areas, "Great Arab Revolt Plaza", commercial, and educational areas exist in this zone
- **Port Areas:** The major features of this area are the main port, cargoes and the southern industrial zone port which will be expanded to comprise a new multipurpose jetty terminal
- **Coastal Zone:** Designed for new resorts and communities with a new marinas, hotels and recreational facilities
- **Southern Industrial Zone:** Comprising the Thermal Power Plant, this area is geographically separated by mountains from the touristic area
- **Airport Industrial Zone:** This zone is located near to the airport, comprising the so-called Qualified Industrial Zone (QIZ), a duty free market for products, and business activities

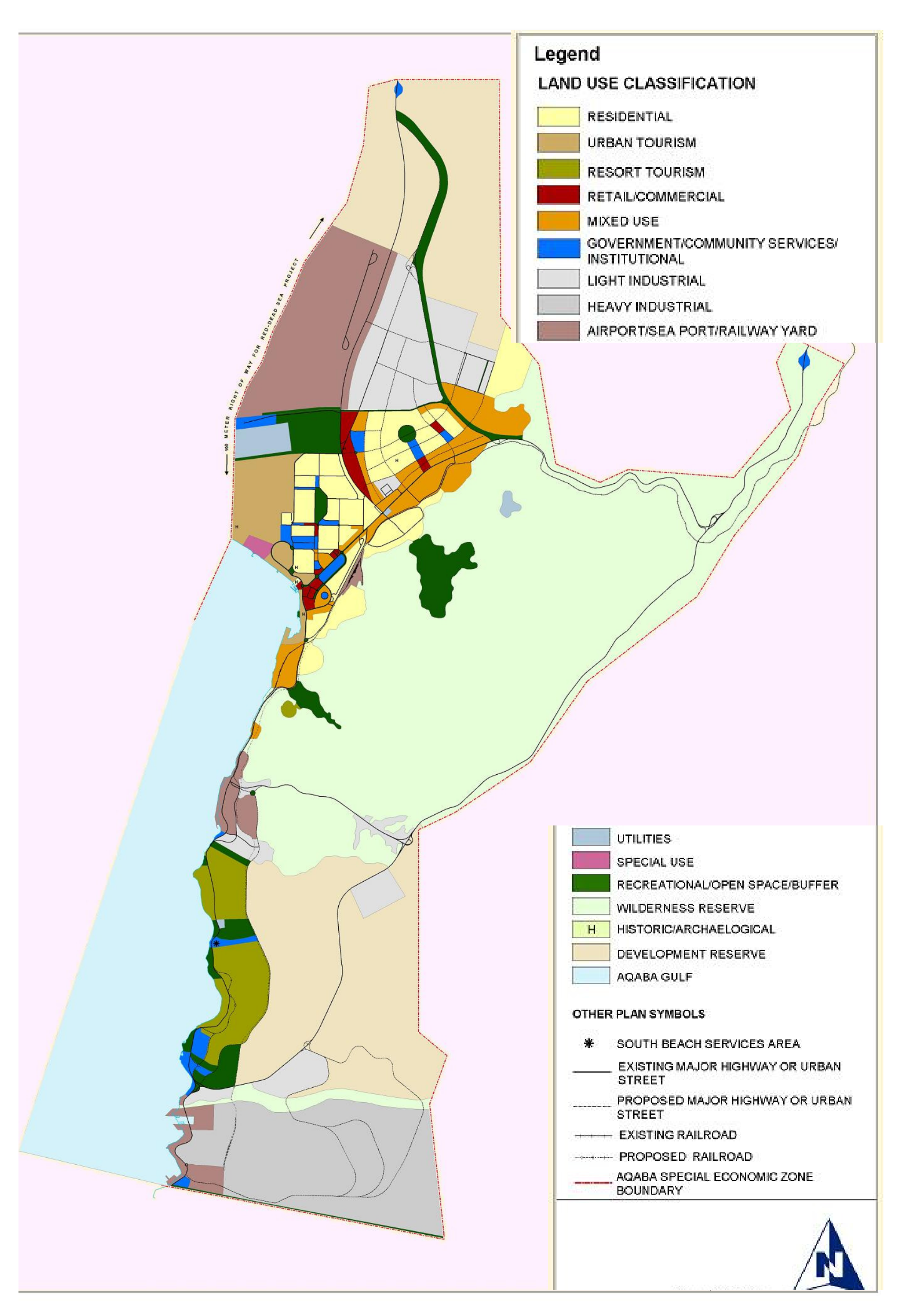
One of the most important outputs from the Master Plan is the so-called Coastline Plan which provides guidelines for any further development of the coastal zone. This Plan focuses on the zoning and clustering of human activities (Alawneh and Lhier, 2006). According to the authors, the components of the Master Plan guidelines related to marine environment include:

- Reduction of waste discharges by ships
- Measures on drainage, sedimentation, and fishing
- Reduction of phosphate-emission from the industrial zone
- Development of restricted areas to protect the coral reef environment

According to the ASEZA Master Plan the distribution and characterization of the beaches along the Jordanian coastline of the Gulf of Aqaba are defined as following (Abu-Sodus, pers. comm.).

- Public beaches: Used by the majority of locals on weekends and long holidays. The main public beaches are:
  1- The Middle beach: This beach is situated near the city center and stretches over 2 km
  2- Aqaba Marine Park: Extends over 7 km and is divided by small-scale beaches which carry local names
- Private beaches: Some hotels have a beach front; the trend of increasing numbers of tourists using the private beaches has been observed during recent years
- Saraya and Ayla Oasis: Ambitious waterfront developments which will dramatically transform Aqaba by extensively creating a new seafront along the coastline of Aqaba by establishing new bays

The ASEZ Master Plan is considered as a key step for guiding the development in Aqaba. However, stricter zoning policies should be developed to protect existing natural resources from over-development and to avoid conflicts among uses, natural conservation, and economical interest. Thus, the preservation of these resources for future generations is aimed.



Map 4: General Land Use and Classification of Aqaba Town; Various Colors Indicate Various Land Uses
Source: ASEZA, 2010

Literature Review

3.1. Risks to Sustainable Development of the Coastline of Aqaba

The latest study and assessment of polluting inputs to the Gulf of Aqaba has been conducted in 2008 by ASEZA and the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA). It aimed to evaluate the degradation of Jordan's coastline. One of the most important outputs of this study is the National Program of Action (NPA) Report.

The report concluded that due to ASEZA's discharge policy, and the prohibition of all pollutants and anthropogenic sources, most of the contaminants' inputs from the Jordanian side to the Gulf of Aqaba are accidentally and of irregular nature (NPA, 2008). Thereby, the main sources of contamination originate from industrial zone's activities and ports which include both, air emission and spillages of bulk material. Moreover, the most significant ongoing alteration and degradation are linked to the tourism industry (NPA, 2008). The major threats to the sustainability of the Jordanian coastline of the Gulf of Aqaba that serve the objectives of this study will be described by the following.

3.1.1. Contaminants

The major contaminants to the Jordanian coastline of the Gulf of Aqaba from industries are mainly from leakage, or lechate of contaminated water and from the settling of substances emitted into the air and thus affecting the marine environment. Furthermore, discharge of cooling water from industries poses another significant artificial input to the Gulf (NPA, 2008). However, this discharged water supposingly does not contain any additives and is ought to stay within an allowed range of temperature.

3.1.2. Expected Risks

Although Aqaba's annual rainfall is very limited, the nature of precipitation is highly flashy, and flooding is causing a significant problem in some areas. Thus, storm water from paved resorts' areas, and floodwater from catchments could enter the Gulf (MSS, 2004). In total, 46 catchment areas are recognized as input from the Jordanian side to the Gulf of Aqaba (NPA, 2008). Table 4 summarizes the 7 main catchments which drain through the urban areas to the Gulf of Aqaba.

Table 4: Catchment Drainage to the Gulf of Aqaba

Catchment Designation	Drainage Area(km^2)	100 year flood peak(m^3/s)
Wadi Yutum / Wadi Araba	1,500	900
Wadi T	10	136
Wadi Jeisheik	9	122
Wadi Mabruk	65	500
Wadi 9	28	279
Wadi 2	62	455
Wadi Shallah	10	133

Source: NPA, 2008

The runoff from different wadis which are mentioned in Table 4 flows down towards the northern part of the Jordanian coastline of the Gulf of Aqaba and passes through the touristic zone of the coral coast which is located in the southern area and the Tala Bay resort. The drainage systems mainly pass through urban parts of Aqaba, discharge occurs by outfalls into relatively shallow area of the upper end part of the Gulf. Meanwhile other coastal wadis either discharge directly into the deep water of the Gulf or pass through relatively short drainage system in route to the Gulf. Furthermore, there is a significant sediment input derived from wind-blown sediments, transport of sand and silt, during sand-storms blown into to the northern part of the Jordanian coastline of the Gulf (NPA, 2008).

3.1.3. Discharge and Spillage from Ports and Industries

The most significant issue at main ports of Aqaba is the phosphate deposition by dust which is released into the air or the sea during unloading of trucks or trains, and loading of ships. Furthermore, spillages occur at the phosphate quay, including spillages directly into the water. Those have negative impacts on the marine environment (Badran, et al., 2006).

In terms of industrial discharges, occasional leakages from the industrial zone and the southern port facilities happen. Some of these leakages may contain heavy metal components. In addition some permitted discharges of cooling water from industrial facilities in the industrial zone are present, which may contain some additives (NPA, 2008).

3.1.4. Marine Aquaculture (Fish Farming)

The rapid developments of marine aquaculture in the region of Eilat (Israel) introduce nutrients and organic pollution to the marine waters surrounding the clusters of fish cages. The lack of regulation of this activity by the Israeli government is raising concern about further eutrophication of marine waters in the Gulf of Aqaba (Wielgus, 2003). Furthermore, around 4 million m^3 of primary treated sewage flow from Israel to the Gulf of Aqaba. Health risks, algal blooms and coral degradation can possibly be triggered as consequences from this environmental problem (Tortell, 2004). Therefore, efforts need to be coordinated on trans-boundary level to monitor and assess the immediate impacts of fish farms of Eliat on the seawater quality of the Gulf of Aqaba.

3.2. Tourism Sector- Key Industry for Development

3.2.1. Tourism in Jordan

The Tourism industry in Jordan is considered as one of the most important investment sectors. In former times it has been called “the hidden treasure” of the country. According to Fischer et al. (2009), the history of tourism in Jordan began in the 4^{th} century, when Christian pilgrims started going to church which had been built on Mount Nebo near the Dead Sea. Figure 2 represents the timeline of developments in the tourism sector of Jordan. It further shows that the last phase of development is the establishment of ASEZA which included a special directorate under the investment commission concerning the tourism’s issues. Furthermore, Fischer et al. (2009) reported that the tourism industry provides a significant contribution to the Jordanian economy. For example, in 2008 the share of the tourism sector was 10.5% of the total GDP. At the national scale employment around Amman contributed by 71% of the total.

In terms of institutional support for the tourism industry, Jordan has put significant effort to push this sector through many institutions establishing a broad collaboration. The most powerful institution is the Ministry of Tourism and Antiquities (MoTA) which was established in 1998. The main objective of MoTA is to encourage the coordination and cooperation through different policies promoting the tourism industry. For example, the MoTA has established on-line maps that are classified according to the type of destinations. These maps provided a photo gallery which helps tourists to find their ways to historical and other touristic sites. Furthermore, the MoTA has published recent studies on opportunities for investing in the Jordanian Tourism Board to enhance and promote information on service providers in this segment information, parks’ development and other touristic facilities (MoTA, 2009).

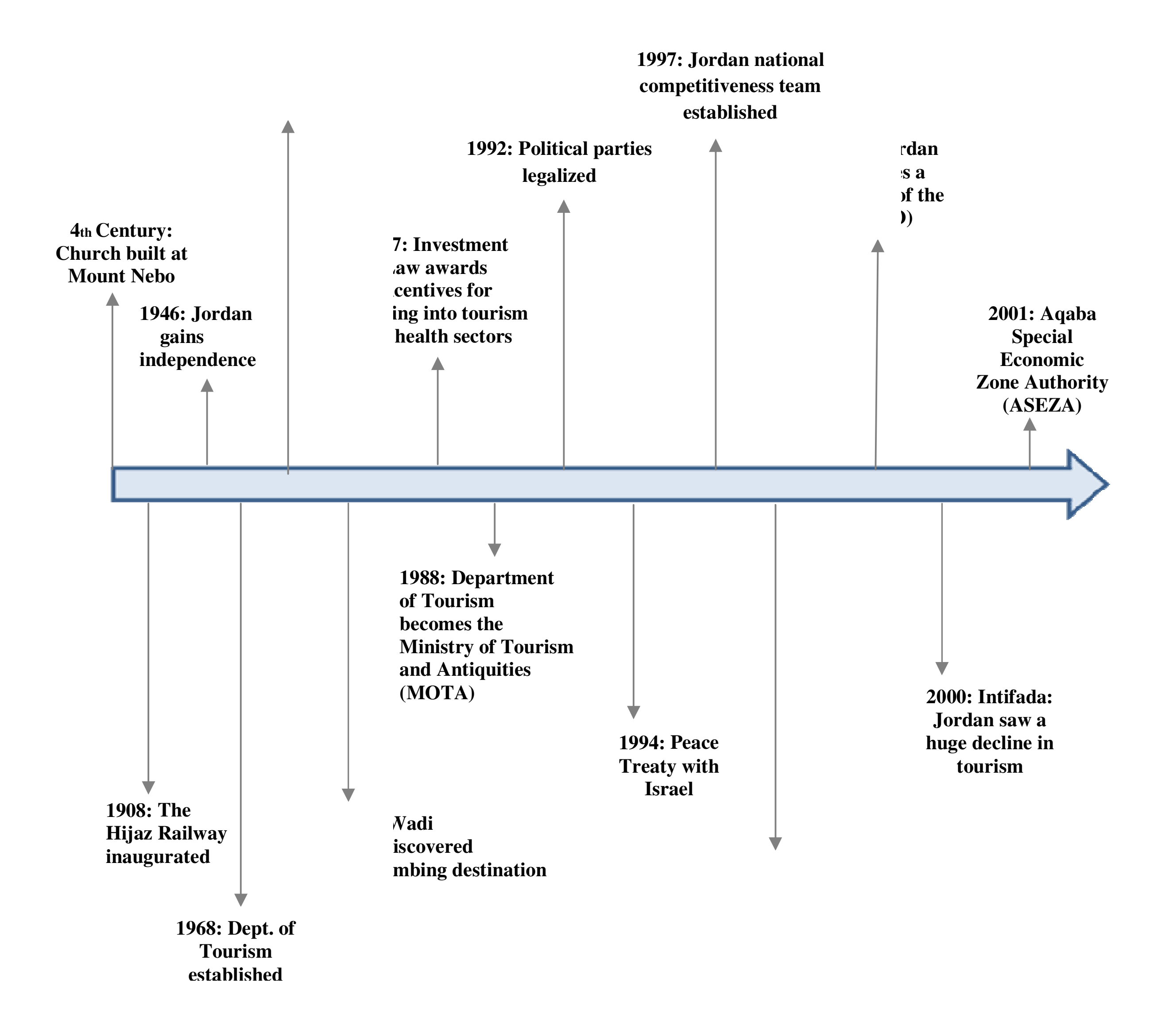


Figure 2: Timeline of Development in Tourism Sector in Jordan
Source: Fischer et al. (2009)

3.2.2. Factors and Development

Aqaba is considered as a distinctive "Oasis City" located in a stunning waterfront setting. It is a popular destination for sun seekers and divers. Moreover, it is a strategic location for Jordanians who come from other parts of Jordan seeking better job opportunities. The Gulf of Aqaba is the only outlet and a gateway linking Jordan with its Red Sea neighbors, and a favored venue for meetings and exhibitions which are serving the Middle East's business community (Al-Kailani, 2008). The combination of the Gulf of Aqaba, Wadi

Rum and Petra, the so-called “The Golden Triangle", makes Aqaba a destination of its own value (USAID, 2009).

Since Aqaba is considered being a touristic area, it is important to mention the relations and the interaction between tourists and the local residents. The fact that tourism usually takes place in inhabited areas, travelling brings people in contact with each other; it generates mutual understanding, leading to reduction of conflicts in the world (Dijk, 2009).

The Aqaba Special Economic Zone is envisaged as a private sector driven development initiative which maximizes private sector participation in duty free, tax-advantaged and flexible regulatory process providing a model approach to environmentally sustainable development and governance, a unique tourist destination on the Red Sea with a relatively high quality of life (ASEZA, 2010).

The Gulf of Aqaba is well known for its diverse coral reef communities which play a significant role in attracting tourists from all over the world for diving and snorkeling in the Gulf. Aqaba’s coral system is considered as the most diverse within the Northern Hemisphere with many endemic species. These highly productive ecosystems are equivalent to those of tropical rain forests due to their abundance of species (Kermeed, 2005).

Many benefits can be achieved from having such precious environmental asset like coral reefs of the Aqaba Gulf Region (AGR). These benefits include the biodiversity, seafood, pharmaceuticals, coastal protection, and recreational value. Table 5 shows some important ecosystem functions of coral reefs.

Table 5: Ecosystem Functions, Corresponding Goods and Services of Coral Reefs

Ecosystem function	Corresponding goods	Examples
Source of unique biological material and products	Genetic resources	Specific for medicine production, jewellery and live fish and corals for aquarium trade
Providing opportunities for recreational activities	Recreation, conservation and education	Ecotourism, awareness-building, and educational diving
Providing opportunities for non-commercial use	Culture	Aesthetic ,sustaining livelihood and scientific values
Trophic-dynamic regulations of population	Biological control	Feeding relationships within ecosystem and among ecosystems
Storage, internal cycling processing and acquisition of nutrients	Nutrient cycling	Nitrogen fixation
Recovery of mobile nutrients and removal or breakdown excess nutrients	Waste treatment	Nitrogen fixation,CO_2/Ca budget and waste assimilation

Source: Karmeed, 2005

3.2.3. Tourism in Aqaba

According to Petra News Agency (2007), the Arab Tourism Ministers' Council has chosen Aqaba as the 2011 Arab Tourism Capital following Alexandria that was announced for the year 2010.

The news reported that the Minister of Tourism and Antiquities at that time has stated that "*Aqaba has vast capabilities and potential to enable it to be put on the world tourism map and be a model world tourism city*". The status of being an Arab Tourism Capital could accelerate touristic development in the near future. Nevertheless, improper planning and management of the tourism sector could also lead to negative impacts to the local environment. Consequently, the city's popularity could turn into a burden instead of an advantage.

The local authority's efforts for promoting the city can be seen through its policy. For example, in 2004 ASEZA adopted a planned marketing strategy and established a tourism directorate within its authority. The main aims of this directorate are to promote the city at the international level and to implement marketing, training, and product initiatives. The European Union (EU) assisted ASEZA with institutional support to develop a five year Aqaba marketing strategy, which had been launched in 2004.

The overall objectives were to broaden awareness for Aqaba as a holiday base, increase the length of stay of visitors, and to drive the brand image of the city through regular programs, hosting journalists and travel writers to re-position the city as international destination (USAID, 2009).

The rapid growth of tourist visitation in Aqaba has spurred interest in further development of tourism as an additional source of "foreign income". Projections forecast substantial increase of tourism for Aqaba within near future. Table 6 shows projections derived from tourism directorate at ASEZA (2010). It is expected that by 2018 tourist activity will have been increased by roughly 180%.

Table 6: Tourism Targets 2003-2018 (hotel nights per year times 1000)

Year	2003	2006	2008	2010	2018
Corporate	88	100	168	260	350
Groups	244	320	490	720	930
Individual leisure	44	60	182	420	550
Domestic	506	520	560	600	690
Total	882	1,000	1,400	2,000	2,520

Source: ASEZA, 2010

Based on the Aqaba Tourism Marketing Strategy Report, (2010-2015) Aqaba still faces some difficulties in terms of efficient marketing. In addition, weaknesses in human resources, visitors' attractions and activities, beach quality, general service quality need to be addressed to lead this sector to further prosperity.

3.3. Impact of the Tourism Sector

The tourism industry is an important factor for Jordan's economy. Nevertheless, the most rapidly growing threat to the coastline of the Gulf of Aqaba arising from Jordanian side comes from touristic activities (NPA, 2008).

Urban development and infrastructure are needed to meet the demand of the tourism industry such as shopping centers, hotels, recreational facilities, airports, roads, and diving centers. All these developments will increase the environmental stressors impairing the marine life of the Gulf.

3.3.1. Pollutants in the Southern Area

Contaminant inputs in the southern tourism area mainly originate from recreational use of the beaches and diving clubs. Inexperienced divers for example that are unfamiliar with treating the coral reefs properly and thus stepping on or break off living coral reef can cause further damages to the marine environment.

In addition, potential runoff containing sediments from hills and wadis can pose a threat to the wellbeing of coral reefs (Karmeed, 2005).

Tala Bay as shown in Figure 3 is a major feature in the southern part of this area. It is considered as a big touristic resort which covers an area of around 2.7 km^2 and stretches along 2 km of a natural beach front. Tala Bay includes residential and recreational facilities which consist of golf courses, an Aqua park, shopping centers, hotels, villas, and other support facilities including staff housing and maintenance facilities (Al-Kailani, 2008).

Further similar touristic resorts represent the major part of the current projects. These projects will have social, economic and environmental impacts on Aqaba. In terms of marine environment, since these projects are located on the coastline itself, it will have a direct impact on the marine biodiversity, such as the disruption of sediments and marine habitat during the construction phase. Glass and pleasure boats, panting and coating

activities during the establishment of the marina at the Ayla, and other big resorts, may possibly contribute to the destruction of aquatic life and will adversely affect the water quality, besides overfill and spillage problems (Badran, et al., 2006).

The major contaminants from the public beaches represented by Area 1 are mainly due to misuse by tourists, littering, vandalism and destroying the facilities representing major risks at this area. With significantly increased use of the Jordan's coastline by tourists' facilities, strong management is needed to control the potential impacts either from the big resorts or public beaches on the marine environment.

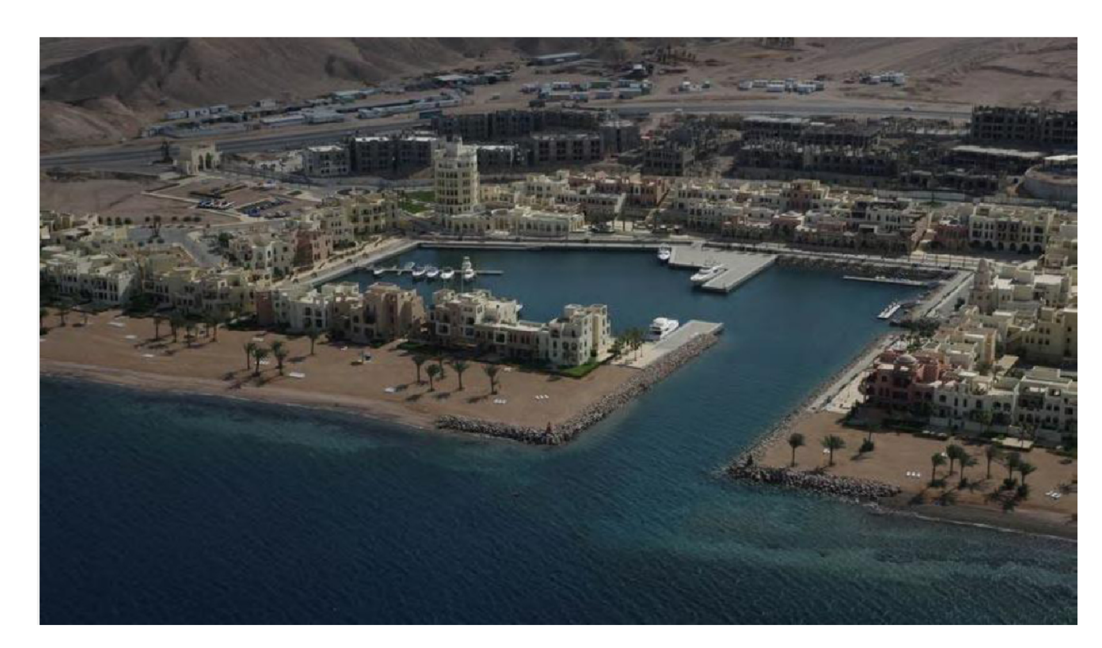


Figure 3: Tala Bay Resort
Source: USAID, 2009

3.3.2. Pollutants in the Northern Area

Based on the NPA Report, there are few known contaminant inputs to this area such as storm water and occasional sewage leakage, litter from cafes and Hafayer area, mobilized or contaminated sediments, nutrients and organic load. Table 7 shows the description of major contaminants in this area.

Table 7: Major Contaminants in the Northern Area

Contaminants	Description
Sewage	Possible and occasional inputs from leaks and floods at the AWWTP, and septic tanks in the urban area. Possible minor illegal discharges from craft in the Royal Yacht Club. Nutrient inputs settle at lower levels in Gulf and up well occasionally giving rise to algal blooms.
Hydrocarbons	Possible leaks from the Royal Yacht Club or glass bottomed boats. Possible future contamination from boats using the proposed Ayla marina.
Litter	Litter from all tourism facilities, especially the cafes at the Hafayer area.
Mobilized or contaminated sediment	Windblown sediment from Wadi Araba deposits to the northern area of the Gulf. Run off of sediment-laden storm water.
Nutrient and organic load	Contamination from the fish farms at Eilat
Storm-water and irrigation water lechate	Possible runoff of contaminated stormwater at a number of discharge points. Possibility of small scale lechate of irrigation water via groundwater

Source: NPA, 2008

Litters and debris from visitors, who come for holidays, notably over the weekends, cause a major environmental issue at the public beaches of this area.

The Royal Marine Conservation Society of Jordan (JREDS) with support of ASEZA holds regular beach clean-up activities including the annual "Clean-Up the World Campaign". The local community is mobilized to pick up litters from the public beaches along the Jordanian coastline of the Gulf of Aqaba where most of the collected garbage originates from land- based sources.

Figure 4 shows the percentage and number of total items of litter that was collected in the clean-up campaign in the year 2009. In total, an amount of 1.01 tons litter was collected.

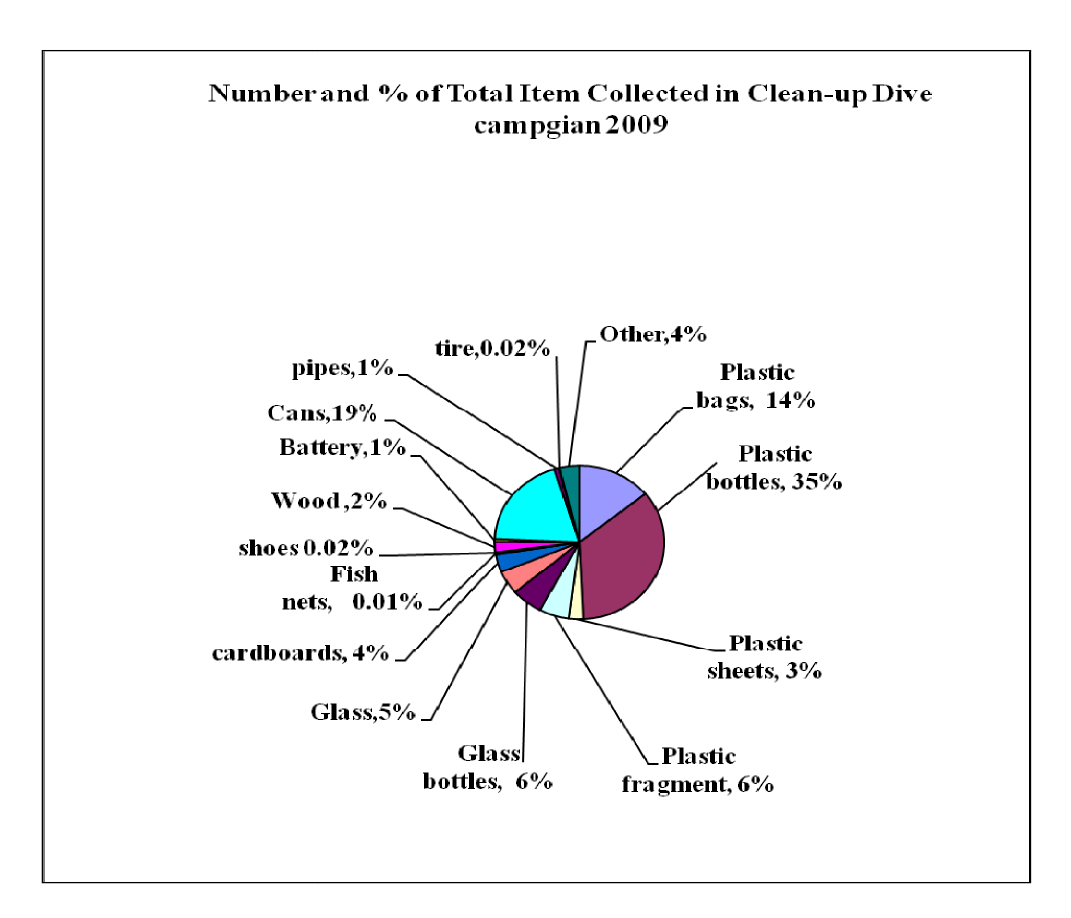


Figure 4: Total Items of Litters in the Clean-Up Campaign, 2009
Source: Adopted from JREDS

"Carelessly" discarded litter and garbage affects every member of the society. It causes harm to people and animals, damages the water ways, costs money for cleaning up, and gives the bad impression that the local community does not care for the marine environment (Teuten, 2007). Sooner or later this would affect the country's reputation.

A comprehensive environmental review of marine plastic in the Mediterranean region in 2001 concluded that around 75% of beach litters are consisted of plastic items (UNEP, 2005).

The threats of plastic fragments on marine life are primarily due to ingestion by marine birds and fishes. The adverse effects of pellets on marine biota may not always be apparent as pellets itself, but accumulate and transfer toxic chemicals to other marine organisms (Mato, et al., 2001). Many scientists who are interested in the marine environment of Aqaba were unable to observe even a one single pellet on the north-

eastern side of the Gulf of Aqaba during the period 1974-1986. However, coming back to visit the same beaches after more than two decades they were shocked about observing large quantities of man-made litters and plastic pellets on the beaches of this part of the Gulf, which was in the past characterized by its clean beaches in addition to its crystal hygienic, warm water, highly diverse fringing coral reef and widely spread sea grass meadows (Badran, et al., 2006). This issue has to be taken into consideration since having a clean and healthy environment is not only important for locals but also for the tourism based economy.

3.4. Introduction to Eco-labeling

According to the Global Eco-labeling Network (GEN), eco-labeling is defined as a method of environmental performance certification that refers specifically to the provision of information to the consumers about the relative environmental quality of a product (GEN, 2004). Thereby, the term eco-label is defined as a logo, label, or tag that identifies overall environmental preferences of a product or services within a specific category and assists the market to recognize the product and services as being less harmful to the human health and the environment than similar products and services with same characteristics and functions (GEN, 2004).

The International Organization for Standardization (ISO) describes three categories of environmental performance labeling. The definitions of these types are described in Table 8.

Table 8: Types of Environmental Performance Labeling

Type	Definition
Type I	A voluntary, multiple-criteria based, third party program that awards a license which authorizes the use of environmental labels on products indicating overall environmental preferences of a product within a category based on life cycle considerations
Type II	Informative environmental self-declaration claims
Type III	Comprehensive data lists that give environmental information on a product throughout its life-cycle where Independent bodies set the categories of information and verify the data given, but unlike type I labels, type III labels do not indicate which products in a category are better or worse.

Source: ISO, 1999

From GEN point of view the overall goal of the three types of labels and declarations is:

" *...through communication of verifiable and accurate information, that is not misleading, on environmental aspects of products and services, to encourage the demand for and supply of those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement*" (GEN, 2004, p.1).

3.4.1. Objectives of Eco-labeling

Eco-labeling has become a useful tool to communicate and promote environmental benefits through their positive influence on consumers, and as an instrument for raising environmental awareness and establishing market by highlighting the available alternatives for certain products or services (Sasidharan, 2002). The idea of eco-labeling has entered the main stream in 1977 when the German government established the "Blue Angel Program". Products that are in comparison to similar products designed in a special environmentally friendly way are awarded with the Blue Angel. This might be expressed in emitting particularly low pollutants levels or noise emissions. Over the years the Blue Angel has proven to be a useful selling tool and alert to ecologically consciousness. Since the introduction of the Blue Angel, eco-labels have become one of the high profile market

based tools for environmental policy achieving environmental objectives in Germany and other European countries (Borregaard, et al., 2005).

In recent years many countries have adopted certain forms of eco-labeling, while commitment to clear objectives has been always critical to the success of these forms. Therefore, three core objectives were established and pursued. According to GEN these objectives are:

- Protection of environment: Eco-labeling should serve as market-based instrument to bring about environmental performance fulfilling specific environmental criteria. Thereby, the efficient use and management of natural resources expressed by reuse and recycling of resources should be encouraged, and the protection of ecosystems and species diversity enhanced.
- Encouragement and promotion of environmentally sound innovation and leadership: For example, eco-labeling programs offer market incentives to environmentally initiatives and progressive business through awarding and promotion of an eco-label logos
- Building consumer awareness of environmental issues: Eco-labeling programs can enhance the consumer awareness of environmental issues through influencing their choices. This can be seen in countries where consumer's awareness is high. In this context, a trusted eco-label that provides reliable information on the environmental impact, can create a market place to promote an eco-labeled product

Concluding from the possibly derived benefits of eco-labeling, great values for the tourism industry could be achieved by this tool, since the certain environmental performance is measured through specific and strictly applied criteria. An environmentally sustainable oriented tourism sector under the umbrella of an eco-label could attract a new target group. Correspondently, the special category of soft-tourism

market which is seeking special environmental conditions and welcoming green activities such as seabird, whale watching, and wildlife tourism could be developed (Sharpley, 2000).

However, despite of all benefits eco-labels offer, some challenges and disadvantages are remaining. Thus, according to Irandu (2004) tourists might be swamped by the great number of different labels and thus tend to not trust those or even ignore them. In this context and in the presence of low standard labels, parties complying with requested high environmental standards and thereby eventually having higher expenses would not be rewarded with the expected recognition.

3.5. The Blue Flag Program

The Blue Flag Program is an international environmental eco-label and voluntary certification scheme for beaches and marinas which managed to achieve the required standards under specific criteria. These standards have been set by the Foundation for Environmental Education (FEE) which is an independent and non-profit organization. In 1991 this foundation has officially become an international organization and in 2006 it had member organizations from 44 countries around the world. The FEE is mainly active through five environmental educational programs. These programs are: Blue Flag, Eco-Schools, Young Reporters for the Environment, Learning about Forests, and Green Key (FEE, 2006).

The idea of the Blue Flag Program was born in 1985, when the first Blue Flags awarded to French coastal municipalities on the basis of criteria covering wastewater treatment and bathing water quality. In 1987, the Blue Flag was brought to the European Level and has worked as an instrument for the application of the EU Bathing Water Directive, comprising other areas of environmental management, such as waste management, coastal planning and protection, besides including the marinas (FEE, 2006). Since then, the eco-

label has gained wide recognition within the tourism sector. It has become one of the most important elements for promotion of the tourism industry and choice for tour operators and tourists. Today the program has reached a level where its presence or absence on the beach plays a role to tourists and tourism business in Europe (Dijk, 2009).

Over the years, stricter and holistic criteria have been adopted, and the program reached regions outside Europe where different sets of regional criteria were developed to serve the objectives of the program. In 2006 these criteria were combined into one international document which is now followed by all participating countries (Michael, et al., 2005).

The implementation of the program outside Europe has started in 1998 when the first Blue Flags had been awarded to beaches of the Republic of South Africa and its marinas. In 2009 over 3450 beaches and marinas were awarded the Blue Flag. Currently 41 countries from Europe and outside Europe are participating in the program (FEE, 2006).

3.5.1. Aims and Strengths of the Blue Flag Program

In recent decades the awareness concept of ecologically carried out tourism has been acknowledged increasingly. In 2001, around 60 different environmental certificates in Europe were awarded to the tourism sector. Out of these, the Blue Flag Program has turned out to be the most successful (Dijk, 2009).

According to the FEE (2006) the main objectives of the program are:

- To promote clean and safe beaches and marinas for tourists, public and local users
- To create awareness of local authorities, private tourism operations and the public about the need and the means to protect the surrounding environment
- To create a basis for voluntary environmental action in communities
- To bring co-operation between the sectors of tourism, environment and education at local, regional and national levels

The success of the Blue Flag label is clearly reported by the results of a survey conducted by FEE in 1997, where 92% of the respondents rated the program as “successful”. Improved water qualities, improved litter management and the opportunities of environmental actions were stated as most significant indicators of its successful implementation (Dijk, 2009).

The strengths of the program mainly depend on its principles and characteristics. According to FEE (2006) these principles are:

- **Positive reinforcement**: This principle highlights the achievements of the award-winning for the applying beaches or marinas.
- **Wide Participation**: Various local and national stakeholders are involved in implementing the program and this will lead to strong base of corporation among different sectors
- **Independent Operation**: The award system cannot be influenced by local or financial interests; this fact will increase the credibility and the transparency of the program
- **Adaptability of Criteria**: The Blue Flag criteria are adopted internationally and allow for expansion of the scheme to different regions. Being internationally accepted and recognized would encourage more countries to participate in the program
- **Voluntary Action:** This confirms the voluntary participation in the program. Therefore, volunteers should accept the responsibility for complying with program's criteria. Participation on voluntary base would increase the creative activities that support the achievement of the program

In this context, and according to the ISO definition, which previously mentioned in 3.3.3., the Blue Flag eco-label would be classified under the Type I since the program is a voluntary criteria based, awarded by a third party and shows environmental practices.

3.5.2. Benefits of the Blue Flag Eco-label

In terms of tourism industry the Blue Flag eco-label can be a reliable source for tourists to choose environmentally friendly destinations. In some cases tourists do not trust what local authority claims and they prefer to see personally an adequate eco-label logo or a special tag that they can rely on (Lunney, et. al, 2005). Accordingly, a survey conducted at some beaches in the United Kingdome revealed that 72% of all beach users asserted that the award status concerning eco-labels, among those the Blue Flag, was an important basis for beach selection (Nelson*,* et al*.,* 2006).

Environmental issues and sustainability have become important factors in the tourist industry. Many investors believe that in future the environmental issues will have high priority since it is directly connected to human health and daily life (Irandu, 2004). Therefore, environmental issues could have a financial influence on the market and would be more evaluated by investors.

In particular, tourists and beach owners can achieve many benefits from implementing the Blue Flag Program. For the local authority and other relevant stakeholders, the eco-label can improve the environmental performance of the tourism sector in targeted areas where some facilities and requirements are needed to be enhanced. Finally if the applying beaches meet the criteria of the program they can raise the flag and show their environmental contribution as a certain kind of promotion which could turn out to provide monetary benefits. Moreover, being a Blue Flag member would increase the trust of the authorities by locals, beach users, and tourists.

From the tourists' point of view they can be sure to use approved safe and clean environment and they can relax in a well-protected area, where first aid and lifeguarding

are also offered. Furthermore, they can access the needed information from the beach itself as well as they can feel the difference in the beach facility especially when it comes to public beaches. Thus, the eco-label could enforce tourist destinations to be managed in an ecologically sensitive manner. Thereto, travel destinations need to keep and enhance their environmental quality for staying competitive in the tourism market.

Last but not least, the Blue Flag members could pay less environmental fines since they ought to comply with high environmental standards.

3.5.3. European and South Africa Blue Flag Experiences

The Blue Flag Program has been introduced at European beaches far earlier than at those South Africa and Morocco. The following presents some experiences from European and non-European countries, adopted from the official website of the program (www.blueflag.org) and Award for Improving the Coastal Environment Report which has been conducted by the FEE (2006).

France: French coastal communities have used the program as a tool to enhance coastal management and to support compliance with national coastal legislation, the Flag is considered as an instrument to ensure that environmental and safety aspects meet the growing expectations of tourists, thus strengthening competitiveness being a tourism destination.

The economic value of the Program for French coastal communities can be recognized through the significant growth in visitor numbers that are often reported by Blue Flag sites and in associated activities.

Spain: In 2005, Spain was the number one country with Blue Flags for representing a world tourism destination. The benefit of the program was noticed from the progress of environmental education and partnerships. The program was run based on information and education of beach users, local population and authorities. As an outcome of

cooperation agreement between the national Blue Flag operator and the national government (Secretaría de Estado, de Comercio, Turismoy Pyme), Blue Flag Manuals with a variety of information materials, which include 60 types of environmental education activities, have been published and distributed for beaches and marinas in Spain.

Furthermore, opening up the program to partnerships with other private sectors has enabled considerable dissemination of information and educational activities that helped to contribute to the implementation of the program at a larger scale.

South Africa: Even though the Blue Flag of the Republic of South Africa (R.S.A.) has only been introduced lately the support of this program by the government and the local authorities which have a direct contribution to the national coastal policy and legislation is increasing rapidly. The achievements made in the province of KwaZulu-Natal in R.S.A. are a good example to show the advantages of the program for the local community. According to the report, the local authority has noticed a number of advantages from being member of Blue Flag Program. These advantages include:

- Job creation for unemployed population (under the Coast Care Project)
- Increase the number of visitors to the KwaZulu-Natal beaches
- Improved behaviors on the beaches (vandalism and damage to property decreases significantly)
- Beach visitor's positive feedback from visiting a well cared and managed beach
- Local businesses are using their local Blue Flags for promotional purposes
- Property prices have risen for homes adjacent to Blue Flag beaches

Morocco: According to the FEE report, the impact of the Blue Flag on Moroccan was observed through the development of beach facilities. For instance, some of the Moroccan beaches are lacking access for disabled visitors. By applying the program these beaches

were equipped with removable wooden ramps and sanitary facilities with specially designed toilets which allowed disabled visitors to enjoy the beach.

Furthermore, another beach established an environmental center that is managed by a local association and offers many environmental activities on the beach.

3.5.4. The Blue Flag Criteria

The award of the Blue Flag Program for beaches is based on compliance with 33 criteria. The criteria are classified as either imperative or being general guidelines. Beaches must comply with the imperative criteria in order to be awarded, whereas compliance with a maximum number of the guidelines is highly recommended (FEE, 2010).

Based on the literature, the most challenging criterion for applying countries to the Blue Flag Program are the water quality standards. Many candidates are unable to meet this criterion because the contaminants and pollutants impairing the water quality are not fully under their control, in addition to the lack of technical skills and financial resources. Therefore, the water quality criterion in this research will be highlighted in depth as well as other relevant criteria will be outlined accordingly. The listed criteria below are based on the latest version of the Blue Flag beach criteria, 2010. However, the flag may be withdrawn permanently or temporarily from accredited beaches, if they do not comply with the Blue Flag criteria.

Environmental Education and Information

The aim of the environmental education activities mainly focuses on enhancing the awareness of users and residents as well as promoting sustainable recreation and tourism activities in the area.

Beaches implementing the program must have at least one Blue Flag information board in a suitable place consisting of all the required information assisted below. In case of the extended beaches, the program recommends to install more than one information board

(approximately one each 500 meters). Furthermore, the Blue Flag information boards must follow the national standards with respect to content, information, and design. Six criteria on the environmental education should be followed. These criteria are:

Criterion 1: Information about the Blue Flag Program must be displayed

Criterion 2: Environmental education activities must be offered and promoted to beach users

Criterion 3: Information about water quality must be displayed

Criterion 4: Information relating to local eco-system and environmental phenomena must be displayed

Criterion 5: A map of the beach indicating different facilities must be displayed

Criterion 6: A Code of Conduct that reflects appropriate laws governing the use of the beach and surrounding areas must be displayed

Water Quality

The Blue Flag Program requires that beaches reach excellent bathing water quality. The bathing water quality standards have been set on the most suitable international and national standards and legislation. The program standards for recreational water bathing quality must be adopted from the applying beaches unless stricter national standards are already in place. The following criteria describe the requested standards for bathing water quality.

Criterion 7: The beach must fully comply with the water quality sampling and frequency requirements

The awarded beach must have at least one sampling site. This site must be located where the concentration of bathers is at maximum and where the potential sources of pollution

like near streams, rivers or storm water outlets are. In order to check that such inflows do not negatively affect bathing water quality, additional samples must be taken at the potentially polluting sites to give evidence of a good water quality.

Samples for microbiological, physical and chemical parameters must be taken at 30 cm depth below the water surface and must meet the Blue Flag bathing water quality standards.

The first sample must be taken within 5-17 days before the beginning of the bathing season. Furthermore, sampling frequency during the bathing season must be carried within an interval of less than 28 days.

In case of abnormal events, such as an oil spill, unusual weather or other extreme factors which can pose a threat on the quality of bathing water, an assigned responsible person must take down the flag temporarily and must clearly display a warning on the information board.

Criterion 8: The beach must fully comply with the standards and requirements for water quality analysis

Criterion 9: No industrial wastewater or sewage related discharges should affect the beach area

Criterion 10: The beach must fully comply with the Blue Flag requirements in terms of the microbiological parameter Fecal Coli Bacteria represented by Escherichiacoli (E.coli) and intestinal Enterococci/Streptococci. The required parameters that have to be monitored are shown in Table 9.

Table 9: Required Biological Parameters of the Blue Flag Standards

Parameter	Limit Values
Fecal Coli Bacteria (Escherichiacoli)	100 cfu/100 ml
Intestinal Enterococci/Streptococci	100 cfu/100 ml

cfu = colony forming units (of bacteria)

Criterion 12: The beach must fully comply with the Blue Flag requirements for the following physical, chemical parameters.

- The pH value range is normally 6 to 9
- There must be no oil film visible on the surface of the water and no odor detected
- The beach must be monitored regarding presence of oil and emergency plans should include the required action to take in case of such pollution
- Absence of debris such as tarry residues, wood, plastic bottles, containers, glass or any other substance

Environmental Management

In recent years, the Blue Flag has grown in size, coverage, scope and influence. Thus, the program has gradually broadened its objectives to improve the environmental management of coastal regions rather than just individual beaches and marinas. The applying beach must fulfill the following criteria referring to environmental management:

Criterion 13: The local authority/beach operator must establish a beach management committee

Criterion 14: The local authority/beach operator must comply with all regulations affecting the location and operation of the beach

Criterion 15: Beach must be clean

Criterion 16: Algae vegetation or natural debris should be left on the beach

Criterion 17: Waste disposal bins/containers must be available at the beach in adequate numbers and they must be regularly maintained

Criterion 18: Facilities for the separation of recyclable waste material should be available on the beach

Criterion 19: An adequate number of toilet or restroom facilities must be provided

Criterion 20: The toilet or restroom facilities must be kept clean

Criterion 21: The toilet or restroom facilities must have control sewage disposal

Criterion 22: On the beach there will no unauthorized camping or driving and no dumping

Criterion 23: Access to the beach by dogs and other domestic animals must be strictly controlled

Criterion 24: All buildings and beach equipment must be properly maintained

Criterion 25: Coral reefs in the vicinity of the beach must be monitored

Criterion 26: A sustainable means of transportation should be promoted in the beach area

Safety and Services

Safety tools and other relevant services are playing a key factor to make the program more comprehensive and successful. The following criteria are requested to be implemented in the applying beach.

Criterion 27: An adequate number of lifeguards or lifesaving equipment must be available at the beach

Criterion 28: First aid equipment must be available on the beach

Criterion 29: Emergency plans to cope with pollution risks must be in place

Criterion 30: There must be management of different users and uses of the beach to prevent conflicts and accident

Criterion 31: There must be safety measures in place to protect users of the beach

Criterion 32: A supply of drinking water should be available at the beach

Criterion 33: At least one Blue Flag beach in each local authority must have access and facilities provided for the physically disabled

3.5.5. Adaptation Process for Applicants to the Blue Flag Program

Based on the FEE (2006), the process of adopting the Blue Flag Program in a new country involves different phases and steps as described by the following.

In the first phase specific institution acting as *national coordinator* must be announced which drives and carries out the implementation of the Blue Flag. This is usually performed by a non-governmental organization (NGO) which must be identified in the applying country before the start-up phase. Afterwards, this organization must become a member of FEE.

Since the idea of implementing the program is non-profitable in principle, the national coordinator of the applying country must be from a non-profit, non-governmental and independent organization likewise. Furthermore, he should have the environmental education, give high priority to the protection of environment, and further must be ready and willing to participate in the other FEE activities.

The national Blue Flag operator will be a person within the selected institution. He or she will be the official representative in that country as well as contact person to the international coordination. The main responsibility of the national operator is to represent the candidates at the jury meetings and to deliver their concerns to the international committee. In order to increase the credibility and the transparency of the program, FEE requires that this operator is not a Jury member, but should be present at the Jury´s meetings to incorporate the applicant.

After this first phase, the following steps must be taken in order to apply for the program. According to the FEE organization, these steps are:

1-Conducting a National Blue Flag Workshop: This workshop should introduce to and discuss the Blue Flag Program with a wide range of possible stakeholders.

2-Establishing a National Blue Flag Jury: This jury should consist of multiple stakeholders representing different interests and expertise. It is important that different stakeholders are included in the national jury in order to ensure that all different elements of the program are involved and well represented. A sound apportionment of representatives will ensure that one party of the program jury does not gain more influence or power than others. Furthermore, the exact representation in the national jury will ensure the highest possible credibility as well as the highest possible knowledge and support to the program on the international level.

According to FEE (2006) differences in national structures of applying countries are acknowledged by addressing varies institutions like the Ministry of Environment, Ministry of Health, Ministry of Tourism or National Tourism Association, Association of Local Authorities, National Sailing Association or other marine experts, National Lifesaving Association, and further NGOs.

Individual municipalities, beach managers, marina owners with direct local interest in the Blue Flag Award are prevented from becoming members of the jury as conditioned by the FEE organization.

3-Initiating the Blue Flag Feasibility Study: The purpose of the feasibility study is to assess the readiness of the candidates to establish the program and to highlight the gaps that need to be filled in order to launch the program successfully. This study is based on a feasibility questionnaire addressing different involved institutional stakeholders. It was developed by the FEE to identify whether the necessary elements of environmental laws, regulations and required criteria are met by the applying beaches.

4-Reviewing the National Criteria: According to the outcomes of the evaluation of the feasibility study, the national jury and the FEE will jointly elaborate on the potential of the implementation of international criteria. These should reflect the applying country´s environmental, social, economic, and human resources, technical capacities, and the institutional framework status. In that phase supplementations and adaptations to the international Blue Flag criteria should be attained and approved by the FEE.

5-Carrying out the Blue Flag Pilot Phase: During this phase the ability of the program's implication would be tested and shortcomings should be adjusted to fulfill the required criteria. Beaches participating during the pilot phase will act as demonstration site.

After the implementation of the previous steps, it is possible for the beaches of the pilot phase to apply for the full Blue Flag Award. The national jury must ensure that an application of possible beaches is conducted and relevant documents are enclosed.

3.5.6. The Blue Flag Bodies and Responsibilities

The Blue Flag Program is coordinated at different levels through international and national juries in cooperation with other relevant coordinators. The value of the program is strongly depending on the strength, competence and dedication of the involved bodies and actors.

In this context, it is important to differentiate between the responsibilities of the national Blue Flag jury and the responsibility of the national Blue Flag administration (national operator).

The Blue Flag jury has the "political" role as the body taking decisions regarding the status of candidates at the national level. Correspondently, the national Blue Flag operator has the "administrative" role as the body serving both the national Blue Flag jury and the candidates as well.

The main tasks of the national Blue Flag jury are to ensure that all necessary and relevant information are available for each candidate, examine candidates and their compliance with the Blue Flag criteria. The jury must ensure that all additional information about approved candidates are forwarded to the international jury. Furthermore, it must proof whether the national control visits are carried out to awarded beaches and marinas during the season.

At the international level, the international Blue Flag jury has the “political” role of taking the decision regarding the status of candidates, and the international Blue Flag coordination having the “administrative” role serving the international jury and the national administrations.

According to the FEE, the international Blue Flag jury is comprised by members of the FEE Executive Board, United Nations Environment Program (UNEP), World Tourism Organization (WTO), International Lifesaving Federation (ILS), International Council of Marine Industry Association (ICOMIA), International Union for the Conservation of Nature (IUCN), Environmental education expert, Health expert, European Union for Coastal Conservation (EUCC), and European Union (only for European countries). This Jury meets twice a year in order to revise the applications that are already approved by national juries, and to take the final decision regarding the Blue Flag candidates. Blue Flag beaches are subject to announced or unannounced control visits at any time by FEE International.

3.6. Compliance of Aqaba’s Environmental Laws and Regulations to the Blue Flag Requirements

The Blue Flag Program requires from the country which likes to participate in the program to provide a feedback about its regulations concerning the environmental management through a given “feasibility study” to the national operator in that country. The following regulations are directly connected to the compulsory catalogue of criteria

required by the FEE. This study will help identifying suitable indicators for a potential adoption of the program by ASEZA through its regulations.

Jordan's Zero Discharge Policy

The success of balancing Jordan's sole sea port with its related infrastructure, functional demands of a growing industrial zone, and the increased demand of the touristic sector for an attractive marine environment is important to the national economy. Therefore, the delicately fragile marine ecosystem and coral reefs have always been taken into consideration by the government of Jordan.

Since the initiation of the ASEZA, a number of important and significant actions have been taken by the local authority to raise and improve the protection of the precious coastline of the Gulf of Aqaba. One of the most important actions is ASEZA's policy requesting the prohibition of any discharge to the marine environment. This "zero discharge policy" was enforced for ensuring that only cooling water, which is the same quality of the seawater itself, brine from desalination works, and storm water are getting discharged into the coastal waters of the Gulf of Aqaba. No wastewater treatment discharges, or any other industrial discharges are allowed to enter the Gulf of Aqaba from the Jordanian side (ASEZA, 2001).

3.6.1. Institutional Framework

The responsibility for the management of the Jordanian coastline of the Gulf of Aqaba lies with one single, powerful local authority, namely ASEZA. This local authority is administrated and supervised by a "Board of Commissioners", which is composed of six full time "minister level members", including the Chief Commissioner and the Vice Chief Commissioner. One of these Commissions is called the "Commission of the Environment" which is devoted to the environmental management and protection of the marine resources within ASEZ. Based on the ASEZ-Law, the ASEZ Board

Commissioners are responsible for protecting and maintaining the environment in the Aqaba zone and for ensuring sustainable development in the area (Al-Kailani, 2008).

Since 50% of the up-coming investment in Aqaba is expected to come from the tourism industry, which largely depends on the environmental conditions in the ASEZ, the main task of this authority is to attract and facilitate investment in the city of Aqaba while maintaining high environment standards. Furthermore, they attempt to homogenize interest in the areas of the tourism industry, port development, utilities and commercial services within the legal framework (Al-Bashir, 2008).

3.6.2. Regulatory Control

Environmental Requirements for New Industries

For any coming industries or projects that could be located in ASEZ, ASEZA maintains a systematic environmental process. Environmental Protection Regulation No.21 (2001) sets out a risk-based approach to control any proposed project that could cause any adverse impact directly or indirectly to the environment in the ASEZ. Therefore, any new industry must carry out an Environmental Impact Assessment (EIA) to explain the potential impact of the activity on the environment.

Inspection and Audit

In terms of existing industries within ASEZ, ASEZA applies an environmental inspection process that focuses on effluents, air emissions, or any wastes resulting from any industry or activity in the zone. Operations in the ASEZ are frequently inspected based on a risk-based regime. This regime consists of light and heavy industries, hotels and resorts, medical facilities, ports and storage facilities. It includes also the emergencies which could affect the environment such as chemical and oil spills, failure of industrial facilities or wastewater treatment unit or any other important facility (ASEZA, 2006).

In terms of violating the rules, the non-compliance of any facility is arranged by a set of actions starting from warning notices, to fines and in some cases suing at courts (ASEZA, 2001).

Environmental Resources and Monitoring

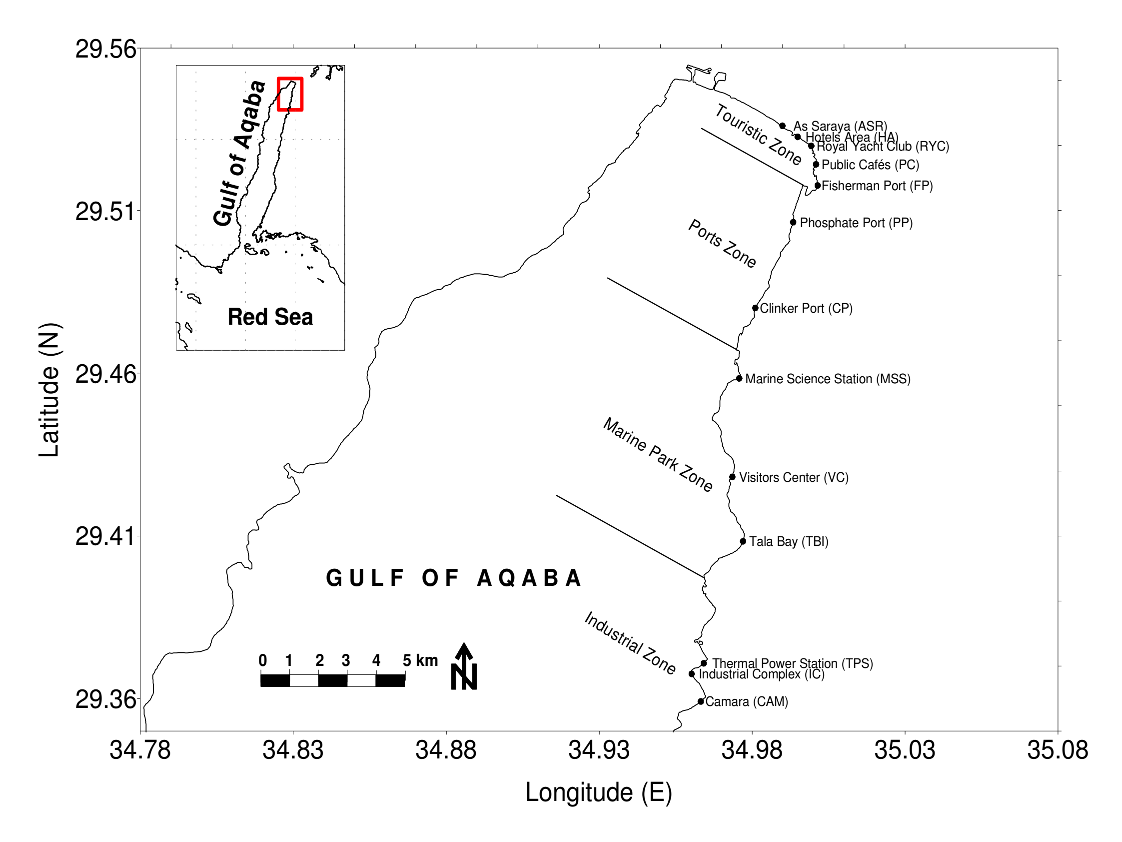
The local authority together with other relevant institutions has set up many permanent environmental monitoring programs for air and marine water quality.

In terms of monitoring the seawater of ASEZ, and under the responsibility of the Environment Commission, a monitoring program was established in the year 2000. This program aims at providing resources managers with necessary baseline data on seawater, bottom surface sediment, and coastal habitat quality. Altogether to give the local authority a clearer feedback about the coastal ecosystem's functioning. This will enable the decision makers to adopt suitable management schemes for the coastline of the Gulf of Aqaba (Badran, et al., 2006).

In cooperation with the University of Jordan and Yarmouk University, represented by the MSS, the Monitoring Program provides monthly analysis and reporting regarding a number of physical, chemical, and biological parameters for a total of 13 shoreline sampling sites, and one offshore reference site that is located 3 km offshore of the MSS. The monitored parameters include physical (transparency, salinity, temperature) and biological indicators plus chemical variables (nutrients, hydrocarbons, Enterococcus, and alkalinity).

Map 5 shows the sampling locations along the Jordanian coastline of the Gulf of Aqaba. It shows 13 sampling points which are disrbuted under four zones that are categorized according to the hosted land use. These categories are: “Touristic Zone”, “Ports Zone”, “Marine Park Zone”, and “Industrial Zone”.

The water depth at these 13 sampling points is about 10 m, while the actual samples are taken at depth of about 1 m. The sampling site that provides references of achievable water qualities is located within the “Marine Park Zone”, protected from possible pollution originating from land-based activities. Sampling depths at this reference site starts at surface and reaches down to 400 m. (MSS, 2004).



Map 5: Sampling locations along Jordanian Coastlines
Source: Adopted from MSS, 2010

3.6.3. Regulations for the Management of Urban Solid Waste

Jordan has a National Solid Waste Management Act as well as it adheres to Agenda 21, in which provisions are made for waste management (MoE, 2009). The regulation of governing the solid waste management in Aqaba is connected to the center of Aqaba services which was called Municipality of Aqaba before establishing ASEZA.

Regulation No.21 (2001), of the ASEZ delegates the responsibility of municipal services under the authority of ASEZA. The regulation for the prevention of littering and

collection of garbage fees are within Municipalities No.1 (1978) which stipulates that "*each house or shop retain a container for garbage that can be made accessible to cleaning workers*" (ASEZA, 2010). However, there is no official program for separation of solid waste in Aqaba. Solid waste and other considerable quantities of recyclable material are sent to final disposal sites which are located at the northern borders of the city of Aqaba. Nevertheless, some recycling programs on a small scale are undertaking trial recycling.

Despite of these regulations, there are no private coastal business organizations adhering to Environmental Management System (EMS) standards at Aqaba in terms of port, marinas, and beaches. The port of Aqaba has solid waste receptacles and provides daily garbage collection via a barge to ships anchored offshore. In spite of this, solid waste is considered as a major issue for reefs and on the beaches at the coastline of the Gulf of Aqaba. Waste is generated and discharged by ferry passengers, ship crews, tourists, and locals. It has become evident that the current management strategies and enforcement techniques regarding waste management within some places, especially at the Aqaba Marine Park and other public beaches, are inadequate. In the light of this, a detailed evaluation of management procedures and the development of Key Performance Indicators (KPIs) must be taken into consideration.

Methodology

3.7. The Blue Flag Program under the Concept of IWRM and ICZM

The research has been conducted under the two concepts of Integrated Water Resources Management (IWRM) and Integrated Coastal Zone Management (ICZM).

According to the definition promoted by the Global Water Partnership (GWP), IWRM is "*a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in*

an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2000, p.22).

The concept of ICZM is defined as *"...a continuous process with the general aim of implementing sustainable development in coastal zones and maintaining their diversity. to this end, it aims, by more effective management, to establish and maintain optimum (sustainable) levels of use, development and activity in coastal zones, and eventually to improve the state of the coastal environment"* (Gibson, 1999, p.298).

It can be easily recognised that ICZM and IWRM concepts are linked through their maxim of enhancing sustainable development. The two concepts aim to preserve resources and protect ecosystems towards negative impacts from human activities.

Social, economic, and industrial activities of riparian countries inevitably affect the environment of their neighbors. This mechanism is especially detectable in the current case of such small and enclosed water body as the Gulf of Aqaba.

The fact that ICZM represent a dynamic process leads to the urgent need of communication and cooperation between the different stakeholders. Cooperation is essential to assist the local communities in understanding the mutual relation between environment and development and the subsequent shaping of the future vision. Thereby, actions towards a long-term and sustainable management of the natural resources could be achieved. Meanwhile, IWRM seeks to achieve sustainability through securing a balance among the three elements of the sustainable development triangle: economic efficiency, social equity, and environmental conservation.

In line with these two concepts the recent United Nation (UN) declaration on land-based sources of pollution states that "*fresh-water management and coastal management should be integrated, reflecting the "continuum" of freshwater and coastal water*" (GWP 2000, p.26).

Accordingly, the Blue Flag Award is seen as one tool in the process of realizing the two concepts. Through the request of compliance with certain standards it facilitates sustainable development and helps to balance and integrate development from the social, economic, and environmental perspective.

3.8. Field Research

3.8.1. Semi-Structured Interviews and Evaluation of Stakeholders

To gain firsthand information from the stakeholders, semi structured interviews have been conducted targeting various institutions and organizations. These interviews have been done over a period of two months during September and October 2010 and have been divided into two parts.

Since the idea of the Blue Flag Program is very new in Jordan, so far none of the Middle and Near East countries has adopted the program including Jordan. The first part of the interview aimed at identifying the stakeholders which could be involved in the program's implementation. It further attempted to figure out whether the certain interviewees have had any experience with eco-labels and the program before. The perception of Aqaba's stakeholders is relevant, as it is important to understand their visions in order to create a sound basis for further cooperation.

The second part of the interview covered environmental issues for identifying the perception of the concerned institution regarding the relation between quality of environment, the preservation or improvement of its currents status, and expected development of the tourism sector in the coastal zone of Aqaba (see Annex A).

In the current case the group of stakeholders is defined as any individual or group that is potentially involved in or affected by the possible implementation the of Blue Flag Program. The approach of semi-structured interviews was selected, because the interviewee would be able to talk freely and directly about the concerned topic, while a

frame of questions allows the comparison of answers given by different respondents. Furthermore, this method is suitable when stakeholders from different backgrounds are involved. Finally, in order to clarify the role of the stakeholders that could be involved in implementing the program an evaluation of possible stakeholder was conducted. Accordingly, the connection between organizations, resources and the way of communication for the involved parties was identified and thereby, the role and benefits of each stakeholder recognized.

3.8.2. Questionnaire

In recent years, Jordan's hotel sector has managed to attract a substantial amount of investment. Therefore, a structured questionnaire has been distributed targeting two private beach users in five stars hotels. Their degree of satisfaction according to private beach facilities and water qualities is of special interest, since private beach conditions are expected to be close to Blue Flag standards. Thus, the acceptance and rating of those standards by users could be proofed. Particularly, the questionnaire aimed at getting an insight tourist profile (age, sex, and home country), and accessing tourists' awareness about the Blue Flag eco-label (see Annex B).

Moreover, it aimed to assess the willingness of beach users to pay an additional eco-tax. Special interest is set into this eco-tax that is a well-known compulsory duty in Germany and in other European countries being raised as "Kurtaxe" (literally a cure tax). This eco-tax aims - inter alia – to raise ecological issues among tourists and could furthermore provide additional financial resources to remedy environmental impacts of tourism Stephen (2003). A possible introduction of this tax could pose a strong complementary tool for the realization of the Blue Flag Program at all beaches.

Public beach users have not been considered as target group, since conditions of public beaches are known as mostly poor.

Moreover, asking whether or not visitors would be willing to pay an “eco-fee” in fact addresses economically potent individuals rather than ordinary members of the local community. The potential revenue derived from having such “eco-fee” raised would be used to improve and to enhance the quality and service offers for both, private and public beaches at the same time.

The number of 130 questionnaires was distributed over four weeks at two private beaches during high season in August 2010. Before the actual distribution of the questionnaire, permission had to be conferred by hotel owners. Some of those did not allow the distribution, since they were conducting own surveys at the time of this research and did not want to burden additional questions to their hotel guests.

At beaches were authorization was given the questionnaire was placed next to the beach manager. Before beach users received their towels etc. from him, they were asked to participate in the survey.

The structure of the questionnaire follows the guidelines by Oksenberg (1991). While the participants have to fill out the questionnaire, the administrator should not attend, and thus cannot influence the participants. Nevertheless, positive response towards the questionnaire could be observed from distance. Occurring non-participation was rather related to language barriers than to the rejection of the questionnaire or the Blue Flag Program.

The questionnaire contained eight categories with 16 questions in total. Since tourists are seeking for relaxation during holidays, the questionnaire was short, concise, clearly structured and plain language was used. Therefore, the type of “closed questions” was chosen. The main advantage from applying this type is getting quick and accurate answers in short time, whereas the results of the requested questions are easy to code.

3.8.3. Field Observations

Field observations were chosen in order to compliment the empirical approach providing an insight into the topic through planned field visits. The aim of these visits was to gain precise knowledge about the selected beaches (the "universe" of the survey). During the months of September and October, a detailed checklist comprising all relevant criteria has been applied in order to identify gaps by the status quo towards compliance with the Blue Flag program (see Annex C). The second objective was to accompany technical personnel responsible for the sampling of sea water in order to judge on the procedures applied (sampling depths and frequency) ought to be in compliance with the Jordanian standards. Finally several field visits were conducted to document the targeted beaches.

3.9. Sources of Information

The data of this study was collected during the months of August, September, and October 2010. Secondary data sets were obtained during planned visits to relevant organizations and the local authority.

At ASEZA, general information which relates to the Environmental Regulations for ASEZ as well as to major threats of the coastline of Aqaba has been collected.

From The Royal Society of Conservation the Marine Environment (JREDS) information regarding the impact of tourism among the coastal zone was obtained. From Bin Hayyan laboratories topical data have been collected regarding sea water quality tests based on historical and recent records.

Published and unpublished dissertations from Jordan University and Massachusetts Institute of Technology (U.S.A) concerning environmental issues have also utilized.

Relevant literature regarding the Blue Flag Eco-label Program and IWRM was primarily obtained by Google Books, Science Direct, Springerlink, and the electronic library of Jordan University.

Furthermore, relevant information concerning the eventual role in the possible implementation of the Blue Flag Program was obtained from various institutions and organizations during interviews with decision makers as well as managers of local hotels.

3.10. Applied Software

In order to get an accurate result, Statistical Package for the Social Science (SPSS) program version 13.0 was used to analyze the tourists' questionnaire. This software is among the most widely used ones in statistical analysis applied by social sciences, governments, and educational researches. Many benefits can be achieved from using this program such as simplifying repetitive tasks, handling complex data manipulations, and professional analysis (Decoster, 2004).

The options offered by this program version that have been utilized for the analysis of the conducted questionnaire shall be illustrated by this section. The following information has been adopted from the manual "SPSS Tables™ 13.0" (2004).

Data of conducted surveys can be processed in tables and depicted on Axis as discrete counts. In addition to those, percentages can be displayed simultaneously. For simple tables percentage of a single categorical variable can be shown either in the concerned column or row.

In order to transfer the collected information of the survey into processable data variables are coded as dichotomies, indicating which value should actually be counted. Multiple responses sets with unique name for each further have to be defined. However, those can be up to seven characters long, while a dollar sign is automatically added to the beginning of the set name.

Typically¸ a multiple dichotomy set consists of multiple dichotomous variables that allow only two possible values of positive or negative (yes/no) nature. Although the variables might not be strictly dichotomous, all of the variables in the set are coded the same way,

and the counted value represents the positive/present/checked condition. Thereby, negative responses are coded as 0, and positive as 1.

In the example of the conducted survey the question of “satisfaction of bathing water quality” five possible responses reaching from “excellent” to “bad” were provided. The respondent can indicate his choice by checking a box next to each possible answer. The five responses become five variables in the data file, coded as 0 for “not checked” and 1 for checked. In case that the answer is “adequate” variables of 00010 would result. However, in the multiple dichotomy set, the only counted value is 1 “SPSS Tables™ 13.0” (2004).

Categories can be rearranged manually or sort categories in ascending or descending order of data values, value labels, cell counts, and summary statistics. Furthermore, certain assembled categories can be excluded from appearing in tables and figures.

Adoption of the Blue Flag Program to Aqaba

In order to implement the Blue Flag Program in Aqaba successfully, organized efforts accompanied with financial and human resources are needed. As a first step the idea of the program was introduced through the Aqaba Blue Flag workshop which was conducted in February, 2010. The aim of this gathering was to attract public´s interest as well as to generate attention from the stakeholders. Furthermore, beach operators could start developing towards meeting the required criteria for obtaining the Blue Flag Award.

The establishment of the Blue Flag national jury will be the second step. In November 2010, Aqaba has formed a proposed national jury that is facilitated by JREDS. Currently they are waiting for its approval by the FEE.

The national operator in Aqaba is announced to be JREDS. This society should start conducting the feasibility study for "the proposed applying beaches" continuously and accomplish it before submitting the application. Depending on the beaches' achievements the Blue Flag pilot phase can be carried out.

3.11. Stakeholders Analysis

Structural changes and possible investment accompanied by the implementation of the Blue Flag Program must be acknowledged and supported by the concerned stakeholders. Stakeholders in Aqaba could include the local community, tourists, public and private sector, NGO's and other organizations. Once the stakeholders of the Blue Flag Program are identified, the position and role of each stakeholder will be evaluated. Thus, an insight view will be given into the potential for adopting the program on the Aqaba beaches.

The analysis of the following paragraphs has been conducted based on information collected during semi structured interviews with possible stakeholders. Those have been identified as main partners for a future implementation of the Blue Flag Program. The response towards the introduced program was positive by all interviewees. Furthermore,

the majority of them were already familiarized with the basic concept by the national operator through the held workshop. However, during the interview more information has been conveyed which leaded to the further support of the single stakeholders. Nevertheless, the support of each stakeholder is crucial for a successful implementation. However, only a minority of the interviewed parties, namely the private beach owners and ASEZA, hold a decision taking position.

Furthermore, the expected role and benefits of each stakeholder are outlined in table 10 of the evaluation of stakeholders. The Blue Flag Award would partly support the already ongoing actions of certain institutions, and partly add new tasks for suitable organizations.

The local community

The local community plays a significant role in the process of adaptation. This group would represent the local citizens and tourists that are not associated with any organization or society but still posses influence on the successful implementation.

Over the last few months several locals expressed their opinion during the Aqaba Blue Flag workshop, some of these opinions included:

"*Make our beaches better places for tourists and locals*"

"People would come more often if they find better beach infrastructures".

The local community in Aqaba could have a positive as well as a negative impact on their environment. They can contribute positively to the successful implementation of the Blue Flag criteria by using the new facilities like waste bins and restrooms and reduce littering or barbequing at restricted areas. If the implementation was boycotted by the local community, realization of the compliance to the required standards could get affected negatively.

The local authority

The local authority ASEZA has the legal power to manage the coastal zone in Aqaba and hence can be a central key for delivering the vision of the Blue Flag Program in the city through certain depicted commissions. The three Commissions that could be integral parts when implementing the Blue Flag Program are:

- Environmental Affairs Commission
- Land Infrastructure and Services Commission
- Investment and Economic Development Commission

Actions that are carried out by these commissions include the monitoring of bathing water quality, organizing litter collection in adequate forms, organizing the collection of waste for recycling. If participating in the program they furthermore could become active in terms of environmental education, applying safety precautions and available services. ASEZA expressed their firm conviction that an international eco-label, such as the Blue Flag Program will be beneficial for Jordan and particularly to Aqaba city.

Royal Jordanian Navy

The Naval base is located in the southern part of the Jordanian coastline. The Royal Navy has the most active responsibility in policing the environmental performance of marine vessels operating at the Jordanian coastline (NP, 2008). The Navy has a significant role in detecting pollution that originates from ships and furthermore contributes in charging polluters at court. Hence, this stakeholder is already working in in-line with the Blue Flag Program's objectives. Key persons at the Royal Jordanian Navy stated of being in favor of the Program. It is believed that the program may help to encourage the sustainable use of natural resources and development of environmental management at the Jordanian coastline of the Gulf of Aqaba.

JREDS

JREDS is a non-governmental organization that has been established in 1995. The main objectives of this society are to contribute in conserving the marine environment and to enhance the sustainable use of the Aqaba coastline. These objectives are partly realized by different actions and activities, such as clean-up campaigns for beaches and underwater, holding awareness workshops and activities, and performing coral reef monitoring.

As the main objectives of this non-governmental organization are to contribute to the conservation of the marine environment and to enhance the sustainable use of the Aqaba coastline, JREDS might help to fulfill the mandatory educational criterion.

The Royal Society expects the Blue Flag’s mandatory criteria to be a progressive mechanism for promoting environmental sustainability on a local level. However, coupled with a community awareness and advocacy program, the Blue Flag Program has the capacity to perpetuate a sense of the community. The hope is that each individual at any level of the community in Aqaba will become thoroughly aware of the benefits of environmentally sustainable practice and the role they play. Such a task force, which is built on a sense of community ownership, is sure to improve the state of not only the coastal areas, but the wider Aqaba region.

MSS

MSS is a research station that belongs to Jordan and Yarmouk Universities. The main objectives of this station are monitoring the coral reef, and assessing the water quality in the Gulf through monthly sea water quality and marine life monitoring program (MSS, 2004). This station could serve as a provider for data collection concerning the marine status for the Blue Flag Program. The general manager of the MSS welcomed the idea of the program. He expects the Blue Flag Program at Aqaba beaches would mean that MSS

gets one step closer to making the Aqaba coastline sustainable. The eco-label could help in limiting the harmful influence from the land-based activities.

The Monitoring Program that is carried out by MSS would be of great benefit when applying the Blue Flag Program. It constantly provides a comprehensive feedback about the natural status of the coastline of the Gulf of Aqaba.

Ben Hayyan laboratories

During the interview with the General Manager at these laboratories, the following information was gathered. Ben Hayyan laboratories were established in 2007 as a joint project between ASEZA and EU Commission. Theses laboratories are internationally accredited by Swedish Board for Accreditation and Conformity Assessment (SWEDAC[1]) and Jordan Accreditation System (JAS) and were granted (ISO 17025) in 2008.

Ben Hayyan offer analytical and advisory services for food and environment under two independent units: the food laboratory and the environment laboratory.

Under the environment laboratory the water quality division provides high quality sampling and testing consultancy for different types of water quality such as tap water, ground water, surface water, swimming pool, bathing water, industrial, and domestic water. These laboratories are taking the responsibility of testing the required physical, chemical, and biological parameters for the applying beaches.

Consequently, Ben Hayyan laboratories could perform the analytical testing of water samples taken in the course of the requested water monitoring.

Aqaba Development Corporation

Aqaba Development Corporation (ADC) was launched in 2004 as a private enterprise that is cooperating jointly with ASEZA and the government of Jordan. ADC acts as a central development body which serves the Aqaba zone. ADC objectives are mainly to ensure

[1] SWEDAC: is a government authority with the objective of making products and services safe and reliable

that the Master Plan for the Aqaba zone is implemented in a systematic way in order to maximize the possible benefits of Aqaba as leading city for business, and leisure destination (Al-Husseini, 2001). ADC has signed an agreement with ASEZA which requires from ADC to acknowledge the importance of environmental protection, especially with regards to coastal zone. ADC is required to develop baseline assessment of the environmental status of the sea facilities and other related problems (NPA, 2008).

The Blue Flag Program would be an important element to ensure the current environmental status of the coastline of the Gulf of Aqaba. In this context, and according to the stakeholder's interview, if necessary, ADC could allocate funds for the implementation of the Blue Flag Program in Aqaba, which will lead to achieve mutual benefits for the ADC and Aqaba city in the future.

Beach Owners

As stated before ASEZA has the power to plan and execute projects in the Aqaba region and further has the full responsibility to manage all public beaches. Conversely, the responsibility of managing private beaches lies within the hands of the beach owners of hotels and resorts. The idea of the program should be promoted to the beach owners, who later on could use the eco-label as a good marketing tool for their beaches. The beach owners at some private beaches stated that besides all benefits that they could achieve from applying the program, an eco-label will give the tourists and even beach owners a feeling that they would be contributing to protect the environment in a good manner.

Ministry of Tourism

As previously illustrated in the literature review chapter, the Ministry of Tourism (MoT) in Jordan is working towards promotion the touristic places in Jordan at international level. By giving the Blue Flag label a central role in the package of publicity tools and by conveying information about achieved beach status, the MoT could facilitate the full

advantages participating beaches could get regarding increased attractiveness. Once beaches are awarded with this eco-label, the flying flag will attract more tourism.

Ministry of Environment

The Ministry of Environment (MoE) is working to increase environmental initiatives and seeking to enhance the quality of life for local citizens through preserving natural resources. This will be achieved through continual innovation and active partnerships with all relevant stakeholders. The MoE could help in implementing the program through media, and suitable environmental campaigns in order to spread the idea of the program. This would be a visible proof for applying means and measures in line with the IWRM concept and other environmental initiatives.

Table 10: Evaluation of Stakeholders

Stakeholders	Role	Benefits
Local community	Enhancing the environmental status of Aqaba coastline through participating in environmental and voluntary activities, changing behaviors on beaches such as stop dumping wastes on the beach, vandalism, etc.	Living in clean and safe environment. Enjoying the recreational facilities.
Local Authority (ASEZA)	Support the public beaches to get certified through protecting the marine environment from possible pollution. Enhance the coastal zone management and other safety and services.	Show good environmental practice for the neighboring countries to act in sustainable manner, high reputation of the city, generation of revenues based on eco-label certification.
Royal Jordanian Navy	Policing the environmental performance of the Jordanian coastline.	The Blue Flag Program would contribute in preserving the marine environment of the coastline from land-based activities.
JREDS	Enhancing the sustainable use of the coastline through awareness's programs and clean-up beaches campaigns.	The Blue Flag Program would encourage the environmental practices on the beach through supporting the educational activities among the beach users.

MSS	Monitoring the coral reefs, assess the sea water quality through marine monitoring program.	The Blue Flag Program would help the MSS to get one step closer to its mission.
Bin Hayyan Laboratories	Testing the required physical, chemical, and biological parameters for applying beaches.	When beaches get certified, the eco-label would be a concrete and visible output for the tested parameters.
ADC	Financial support.	The program would be part of the required assessment from the ADC. Having the eco-label would give a positive sign for any development by ADC.
Beach Owners	ASEZA would work on private beaches to get certified. Private beaches owners could help in maintaining the beaches and to fulfill the required criteria.	The beaches would improve the image, reputation, and competitiveness and thus attract more tourists to keep coming to Aqaba, Generation of revenues based on eco-label certification.
Ministry of Tourism	Promotion the idea of the Blue Flag Program and coordinate with other stakeholders to implement the program.	Having the Blue Flag would provide marketing advantages. The ministry can use the eco-label in advertising the country which could and lead indirectly to financial benefits.
Ministry of Environment	This ministry could help promoting the Blue Flag Program via media and campaigns to create and raise the environmental awareness.	Implementing the program would be a visible proof for applying means and measures in line with IWRM concept, and sustainable development.

Source: Author

As illustrated in Table 10 all above mentioned stakeholders would have a potential or real stake when implementing the program. Nevertheless, some stakeholders will have more influence than others.

In this context, ASEZA and owners of private beaches will have the strongest influence and the final decision with the national coordinator whether or not certain beaches apply for the Blue Flag Program. Based on their decision, other stakeholders would take suitable action accordingly. ADC and the relevant ministries could help in funding the required costs. Whereas Royal Jordanian Navy and MSS would support the data base required

about the current status of the coastline of the Gulf of Aqaba. The laboratories could take the responsibilities of taking the required samples. The local community would be involved in the environmental activities that are required by the program, beside their essential role to protect the marine environment.

3.12. Expected Costs and Fees of the Blue Flag Program

Different sources of financing the Blue Flag Program can be mobilized on the local level. The operations of the program do not have to be necessarily expensive. Nevertheless, certain expenses should be covered per beach in order to adopt, implement and maintain the program.

Program fees will be charged by the FEE. However, concrete numbers are currently lacking and the exact amount of fees is yet not known but expected to be marginal.

Other associated costs will include the necessary adjustments and improvements to the public beaches facilities, required signs and flags, annual Blue Flag levy per beach[2], bathing water quality testing[3], and operation costs including salaries for beach manager, lifeguards, etc.

To cover for expenses for investing into the development of public beaches, this research proposes an eco-tax meant to be the main source of funding.

[2] Beach levy according to the national operator amounts to approximate 900 JD, depending on the number of sites involved in the applying country

[3] Based on the interview with the laboratories water quality sampling tests cost is around 150 JD per one sampling point per month

Evaluation of compliance to the Blue Flag Criteria

This chapter will evaluate the compliance of the Blue Flag criteria with respect to the Jordanian standards in terms of water quality criterion. Other requested criteria will be highlighted briefly through reflecting the current situation in Aqaba regarding environmental management, environmental education, and safety.

3.13. Water Quality Criterion

Coastal waters and other water bodies such as rivers and lakes are used for a wide range of recreational activities, like water sports, fishing and sailing. If these activities wanted to be enjoyed safely, certain attention and special consideration must be given to the potential health hazards. At the same time prevention of the excepted accidents that may happen due to the lack of required safety measures shall be encased.

Water-based recreation is an essential component of leisure activities and tourism in all countries around the world. The associated health benefits of bathing in saltwater are promoted with enthusiasm. In former times sea water was considered as an alternative therapeutic treatment to spa water (Reiss and Hottinger, 1984). These attractive factors could be noticed particularly through the annual influx of tourists from European countries to the Mediterranean region and especially to the Gulf of Aqaba.

Although positive effects from the recreational use of the sea water in coastal areas are desired, negative consequences for the health of tourists and the coastal environment cannot be excluded. For example, touristic activities can expose individuals to a variety of health hazards, such as disease-carrying bacteria, viruses, and pathogens. Human and animal wastes reaching water bodies pose threats to individuals by contaminating seafood, drinking water and swimming areas. Eating seafood and even swimming in polluted water can result in hepatitis, gastrointestinal disorders, and infections (Doyle, 1993).

Keeping the good quality for coastal water is further important for visual reasons since beach users judge water quality by its visual appearance. Thus, the aquatic environment is much more attractive when the water is clear and tourists can see the sea bottom and enjoy underwater life. Additionally, good water quality offers better living conditions for marine species which results in their prosperity. Consequently, the marine environment sustains attractive for coral reef tourism and reliable for the fishing industry.

Undoubtedly, risks of beach users including drowning and trauma associated predominantly with diving incidents and potential infections acquired from contaminated or polluted waters are those that demand most attention. Hence, the various natures of the threats to human health that are posed by recreational waters demand and require full audit and monitoring programs according to the relative importance of the possible resultant health effects and the resources to mitigate those (WHO, 2001).

Additionally to the importance of water quality posed directly to human and marine wellbeing further consequences are needed to be taken into consideration.

As Jordan is suffering from severe freshwater shortage, it is seeking for alternative sources to satisfy the increasing demand. In this context, desalination projects at the Jordanian coastline of the Gulf of Aqaba are planned as unconventional source of freshwater. Hence, the sea water quality is determining the operation costs and water quality that is achieved by this process.

3.13.1. Jordanian Bathing Water Standards

At the local level, Jordan adopted bathing water standards (JS1536/2004) issued by the Water and Wastewater Committee of the Jordanian Institution for Standards and Metrology (JISM) on 26/7/2004. These standards are mainly adopted from the World Health Organization (WHO) for the regulation of the sea water quality requirements (ASEZA, 2010).

Based on Jordanian bathing water standards the only biological parameter that must be monitored is the intestinal Enterococci/Streptococci Bacteria. The threshold for this parameter is 158cfu/100 ml.

According to the Jordanian standards, the required frequency of seawater sampling varies with the intensity of the current bathing season. While during high bathing season two samples per month are demanded, in off season the frequency is reduced to one per month. However, the total samples should not be less than 20 samples per year and should be taken from 3 depths as following:

- Ankle depth (0.15 m on shore and below 0.075 m below the water surface)

- Knee depth (0.5 m and 0.25-0.3 m water depth)

- Chest depth (1.3 m and 0.25-0.3m water depth)

Figure 5, which is adopted from the Environmental Protection Agency (EPA), demonstrates the three depths at the sampling location.

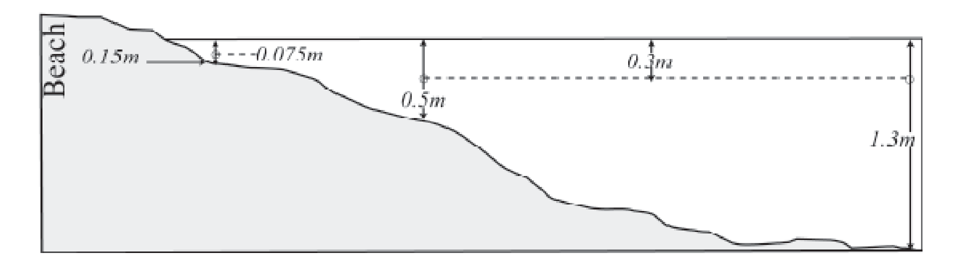


Figure 5: The Three Depths at Cross-Section of the Beach at Sampling Location
Source: Adopted from EPA, 2005

In terms of physical and chemical parameters, the pH value threshold range is from 6.5-8.5. Water should be sufficiently clear that a Secchi Disc[4]is visible at a minimum depth of 1.2 m. There must be no oil film visible on the surface of the water and no specific odor detectable. The beach must be monitored regarding oil, and an emergency plans that

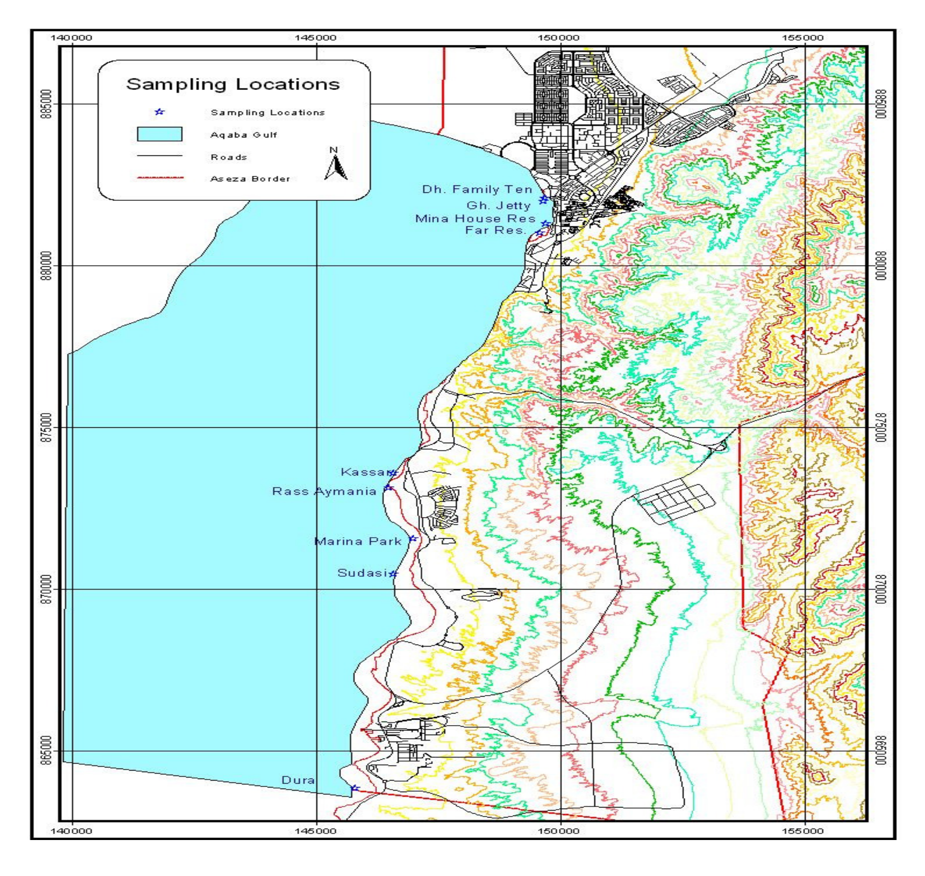
[4] Secchi Disc: an instrument used for measuring the clarity of water especially sea water, (Verschuur, 1997)

describe the required action to take in case of such pollution must be provided. Furthermore, no debris should be present.

3.13.2. Jordanian Standards Applied by ASEZA

Regarding the monitoring of bathing water along the Jordanian coastline of the Gulf of Aqaba, the local authority under the Environment Directorate is taking periodically samples from nine different sampling locations. These locations are chosen according to the highest concentration of bathers.

Since Aqaba´s warm climate allows water sports and other water-based activities throughout the entire year, the region does not experience the classical variations of high and off seasons. Moreover, with respect to Jordanian standards, the sampling frequency of twice a month has been adopted throughout all seasons for the mentioned parameter as precaution measure to ensure good water quality within the limit values during the entire year. Map 6 shows the different sampling locations at touristic areas along the Jordanian coastline of the Gulf of Aqaba.



Map 6: Sampling Locations at Different Tourism Locations along the Jordanian Coastline
Source: Adopted from ASEZA, 2010

According to the Divisional Head of the Water Resources Management Department at ASEZA, recent reports show that during the last two years the bathing water quality was good and not exceeding any threshold values. The only exceptions were reported during some irregular events due to the intensive bathers in formal holidays and accidental spillage. Nevertheless, corrective actions have been taken to ensure the health conditions of tourists such as closing the polluted beaches and prohibiting people to swim at these locations (ASEZA, 2010).

The responsibility of taking samples from bathing water at public beaches is under ASEZA's control, whereas collecting samples from private beaches is under the responsibility of Ben Hayyan laboratories. However, analyzing bathing water samples for both public and private beaches is under the responsibility of Ben Hayyan laboratories. Collecting water samples properly is very important to ensure that correct results are

obtained. Therefore, special care of the samples must be taken to avoid external contamination during the collection.

During the time of this research a meeting was held with the environmental directorate and the Water Resources Management Division as well as the samples collectors to discuss these issues. One of the most important outcomes of this meeting was the proposal of introducing a detailed beach sampling form for the samples in compliance with internationally accepted standards. This was done after reviewing various sampling forms of different health organizations. Accordingly, the most important parameters for the Gulf of Aqaba concerning bathing water were evaluated and consequently adjusted to the current sampling procedure. These parameters include the day, time, location, and visual tests like odor, color of the bathing water, activities at the sampling sites and further important characteristics that need to be identified for sound sampling. The visual color and odor tests for public beaches should replace the currently required tests performed in external laboratories and thereby reduce monitoring costs. The proposed adjusted sampling procedure should be carried out by sample collectors, employees of ASEZA. The proposed beach sampling form (see Annex D) was instantly approved and adopted by ASEZA.

3.13.3. Comparison of the Blue Flag to Jordanian Bathing Water Standards

Although ASEZA is taking regular samples from different sampling locations along the Jordanian coastline of the Gulf of Aqaba, it is still not matching with all the requirements of the Blue Flag. Currently, ASEZA is measuring one biological parameter although the latest version of the Blue Flag criteria requires two. Furthermore, the measurement of physical and chemical parameters requested by Jordanian and Blue Flag standards are currently not carried out by ASEZA. However, Jordanian standards require three depths from each sampling point while the Blue Flag Program requires one depth only from each sampling point.

Currently, Ben Hayyan laboratories carry out for one private beach that is in the preparation phase of applying to the Blue Flag Program (proposed Area 2) all parameters on one depth. Only the biological parameters, though requested by Blue Flag standards on one depth, are carried out on three depths. In general, Ben Hyyan laboratories follow the stricter value for each required parameter either by Jordanian or Blue Flag standards. Thereby, in terms of biological parameters, the laboratories follow the stricter Jordanian standards.

Furthermore, in the case of sampling locations the Blue Flag Program requests sampling points for each area of 500 m length and 20 m width. Consequently, the number of sampling points will be determined by the surface area of the targeted beach. In the case of public beaches, ASEZA has implemented a total of nine sampling points. However, sampling points and number must be chosen according to potential risks, threat of pollution, and density of bathers. Consequently, the location and distribution of the installed nine sampling points must be checked towards their compliance with the requested standard.

Table 11 shows the differences between the Jordanian standards and the Blue Flag requirements in more details.

Table 11: Comparison between Blue Flag and Jordanian Standards

Parameter	Blue Flag Requirements	Jordanian Standards	Limit Values Based on the Program	Remarks
Total Coliform Bacteria	Required for European Beaches	Not required	<500 cfu/100ml	Total Coliform Bacteria are not required. Nevertheless, Ben Hayyan labs are measuring this parameter for applying beaches
E.coli	Required	Not required	100cfu/100ml	Ben Hayyan labs are following the stricter criteria for each parameter. Therefore, they are testing this parameter for the applying beaches.
Enterococci	Required	Required	100cfu/100ml	According to the Jordanian standards the threshold value of this parameter is 158cfu/100ml. Since Ben Hayyan labs are following the stricter criteria they considered the100cfu/100ml as a limit value.
pH	Required	Required	6.0-9.0	According to the Jordanian Standards, the threshold value of this parameter is 6.5-8.5. However, this test is not practiced by ASEZA for bathing water. Ben Hayyan offer this test for applying beaches
Surface active substances	Required	Not Required	<0.3 mgl/l	This test is not practiced by ASEZA. Ben Hayan labs. offer this test for applying beaches.
Oil and floatable residues	Required	Required	Normal	Recently this test is practiced by ASEZA through the new beach sampling form.
Color	Required	Required	Normal	Recently this test is practiced by ASEZA through the new beach sampling form
Phenol	Required	Required	No specific odors	Recently this test is practiced by ASEZA through the new beach sampling form.
Turbidity	Required	Required	Clear	This test not practiced by ASEZA. Nevertheless, Ben Hayyan offer testing this parameter for applying beaches.

3.13.4. Comments on the Required Standards

Total Coliform Bacteria

Based on the beach criteria by FEE (2010), Total Coliform Bacteria are only measured at European beaches and only if the country is not yet applying the new EU Bathing Water Directive. Since the applying beaches for the program in Aqaba are following the new EU Bathing Water Directive, there is no need for having such test.

Accordingly, dropping this test will stretch the budget for testing, increasing the potential of supporting more beaches in the application to the program, and will allocate more resources and time for further sampling tests.

If identifying the most efficient and meaningful indicators and measures, one should reach out to institutions that already have implemented those successfully.

In the previous years, the most commonly used indicator of recreational water quality was Total Coliforms (Borrego, et al*.,* 1995). However, based on the Canadian guidelines and other health institutions for recreational water quality, the measurement of this general group of bacteria is rather considered being as unsuitable parameter to detect the fecal contamination in sea water and bathing areas.

However, according to Doyle (1993) Fecal Coliforms have all the properties of Total Coliforms. Furthermore, most of Total Coliform Bacteria are harmless to humans while Fecal Coliform Bacteria indicate to fecal contaminations and may cause intestinal distress, nausea, vomiting and even death (Kay, et al., 1994).

Enterococci/Streptoccoci and E.coli

The Enterococcus Bacteria belong to the family of Streptococcaceae which were formerly classified as part of the genus Streptococcus. These bacteria are considered as the best available indicator of fecal contamination in marine waters due to the fact that they

survive in marine conditions for a considerable time and thereby are available for possible detection.

Contrarily, Fecal Coliforms represented by the number of E.coli[5] Bacteria do not survive well in marine waters and thus may not be reliable indicators of fecal contamination for marine waters (WHO, 2001).

However, many countries continue to use Fecal Coliforms as their primary health risk indicator based on the fact that Coliforms are considered indicative of recent pollution (EPA, 2005).

According to the health concerned organizations' point of view it is useful to measure a variety of indicators for assessing the risks of adverse health outcome. Therefore, it would be appropriate to group together Fecal Coliforms and Streptococci for a comparative measurement even though the Fecal Streptococci alone appears to be a sufficient bacterial indicator identifying any health related risks in marine waters.

When detecting bacteriological contamination, certain limits ought to be kept. In estimating the risk levels for exposures above 158 Fecal Streptococci/100 ml, the World Health Organization (WHO) has adopted the assumption that the probability of illness remains constant at the same level as exposure to 158 Fecal Streptococci/100 ml, rather than continuing to increase (WHO, 2001). Moreover, and according to Kay et al. (1994), the maximum level of Fecal Streptococci that measured in the United Kingdom randomized controlled trials was 158 Fecal Streptococci/100 ml. Nevertheless, Ben Hayyan laboratories are taking the stricter standards for each parameter. Consequently, the tolerated threshold value for the Enterococci shall be 100 cfu/100 ml as stated in the Blue Flag criteria.

[5] Greater than 90% of the Fecal Coliforms are E.coli. Therefore, E.coli and Fecal Coliform test will be considered equivalent (WHO,2001).

The Sampling Depths

The Jordanian bathing water standards require different depths for sampling. According to Mugglestone, et al. (2000), chest depth (1.3m and 0.25-0.3m water depth) is the location at which immersion is taking place and frequently visited depth by adults. Therefore, it is considered to be the most appropriate depth at which to assess personal exposure.

Sampling in chest depth water typically represents areas of greatest bather density although sampling at the ankle depth may be appropriate to determine risk to young children.

In the literature the ankle (0.15m on shore and below 0.75m below the water surface) depth belongs to the swash zone. This zone is defined as the area of the beach where waves continuously wash up on sands. In recent years the swash zone has received greater attention in terms of the safety of the beach environment and its importance for health, especially for children (WHO, 2003). During the meeting with water specialists at Ben Hayyan laboratories, the issue of different sampling depths was discussed in order to combine the Jordanian standards with the Blue Flag requirements. The expert explained that from their experiences during the previous years, it was figured out that the results of chemical parameter tests remain the same at the three different depths. However, differences at various levels become apparent for biological parameters. These are directly related to human induced impacts. They differ from one depth to another depending on the users' age and behavior. Therefore, the E.coli and Enterococci samples are only taking from three sampling depths while other requested parameters are only taking from one depth.

The Blue Flag Program requests only one depth for all water quality parameters. Applying beaches should adopt the Blue Flag standards unless stricter national standards are already effective. This could lead to an inconsistent sampling procedure. Nevertheless,

depending on the applying country's sampling frequency, depth, and other requested parameters can be negotiated with the international jury.

Consequently, Ben Hayyan laboratories in cooperation with the national operator of the program JREDS must carry out a critical review based on the most recent scientific knowledge referring to health risks associated with recreational sea water activities. The most appropriate depths for the concerned parameters should be identified for ensuring uniform assessment procedures.

3.14. Environmental Education Criterion

In the frame of environmental education the Blue Flag Program requests a holistic approach that attempts to integrate knowledge transfer as well as educational activities.

The classical definition of environmental education as reported by the International Union for the Conservation of Nature (IUCN) is "the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings" (IUCN,1991). Environmental education also entails practice in decision making and self-formulation of a code of attitudes addressing environmental quality.

Furthermore, the concept of Environmental Education for Sustainable Development (ESD) is acting supportive for realizing the various fields of the holistic aim. The term of ESD is a broader concept than classical Environmental Education. It covers the major aspects of sustainable development regarding social, economic, and environmental aspects. It furthermore aims at educating all members of the society for becoming responsible citizens who are aware of the consequences of their actions.

Environmental Education gained official interest in 1999 for the first time in Jordan followed by the development of the National Strategy for Environmental Education. This strategy aims at enhancing the concepts of awareness and communication in practical

measures as well as to enhance and develop values, knowledge and institutional capacities in order to achieve specified objectives and to improve the welfare of people and the environmental system (METAP, 1999).

At the local level, JREDS is particularly working to draw special attention of the creation of awareness concerning environmental issues and particularly the marine environment among the youth since they are the citizens of tomorrow.

As Table 12 indicates, a number of educational activities that fit to the required criteria are already provided by JREDS, who happened to be the national coordinator of the Blue Flag Program. These activities aim at capacity building and encouraging the youth to be more involved in conserving the marine environment at Aqaba. Applying activities like underwater photography exhibit, beach clean-up campaigns, and special educational activities including lectures and workshops will raise the awareness of the local community and tourists towards environmental issues. It further will promote long-term and positive changes in behavior.

The mentioned activities match the requirement of the program and will act as a tool to fulfil the following purposes within the frame of the requested environmental education. It will enhance the raise of awareness, to communicate knowledge, and influence attitudes towards environmental aspects. It furthermore will provide participants with new skills. However, the firm involvement of stakeholders is condition for the successful implementation of the concepts as well as for the Blue Flag Program itself.

Applying the above activities, the idea of integration under the umbrella of environmental education could help to improve critical and moral reasoning, and allow an individual to come to their own conclusions toward the environmental issues. Thus, enhance the appreciation of the marine environment and other natural resources.

Table 12: Possible Educational Activities Proposed by JREDS

Activities	Message	Targeting Group	Goal	Method
Dive clean-up	Awareness for divers and visitors	Divers	Train the divers how to arrange proper clean up in the sensitive areas	Practical
Environmental games	Let us make our kids love our environment	Visitors and students	Awareness by fun	Practical
Beach watch	We all responsible of our environment	Volunteers	Train the volunteers how to write reports in case of violating the environmental laws and regulations	Case Study about oil spill/ Practical
Seminar and Showing a Film about the Marine Life in Aqaba	Education	Students/Tourist	Importance of the marine environment	Theoretical
Learn how to snorkel	Learning by doing	Visitors/ Students	Show the participants the marine Life underwater	Practical

Source: JREDS,2010

3.15. Environmental Management Criterion

The Blue Flag Program requires applying specific requirement under the environmental management criteria to manage beaches along coastal zones. These requirements are working under the umbrella of the concept of ICZM, which is a well-known approach for managing the coastal areas throughout the world. The Blue Flag Program is part of the ICZM concept as the program is not restricted to improve the environmental quality of the coastlines only, but also its respective management and social based in a holistic approach.

As the demand by tourists for high quality level of environment increases, the task of managing the coastal and marine resources will grow in importance to maintain their functions and services they provide.

The unique coastline of Aqaba is a very important national asset. Jordan has recognized this special status including the need for some form of integrated management especially when it comes to the marine environment. According to the Jordan Report on “ICZM Experience” (2004), Aqaba has received special treatment by the national government to ensure its survival as a lifeline of the Jordanian economy. This has resulted in defining clear polices for the use of the coast and its subsequent management through an integrated approach and under an adequate legislation.

According to the report, one of the ICZM requirements in order to achieve high performance of integrated coastal management is the presence of a “coastal planning management authority” or its equivalent. Since ASZEA is a legal entity of Aqaba it can implement adequate policies and sufficiently support to this process.

A large apparatus of regulations and policies installed by ASEZA already exists. Nevertheless, it is lacking sufficient coverage and specification in certain regards. In addition, the current implementation of those regulations might indicate a direction, but does not reach a satisfying level. Consequently, for fulfilling the checklist as given by the Blue Flag Program, certain aspects must be improved and extended. A deeper evaluation in this regard is done in chapter 7.

3.16. Safety and Services Criterion

The safety and services criterion appears to be not connected directly to the environmental issues like other criteria. Nevertheless, the requirements of this criterion are directly connected to the wellbeing of human.

Each season deaths resulting from drowning are reported for the Gulf of Aqaba[6]. This is mainly related to the lack of education about the marine environment, deficit of safety devices and supervision, or inability to cope with emergency events. Drowning or other

[6] At the time of this research six different drowning events happened at the Jordanian coastline

water accidents impact residents and visitors alike. A reputation for unsafe beaches can impact tourists towards choosing safer destinations.

Hence, it is essential to offer desirable and convenient beach locations with properly trained and equipped lifeguards, and thus offering protected areas for swimming and other activities for ensuring the prosperity of the tourist industry.

Lifeguards who are responsible for providing beach safety and rescue services are presently not provided on the public beach areas of the Jordanian coastline of the Gulf of Aqaba.

By the implementation of the Blue Flag Program safety for tourists will be improved, since currently public beaches miss the required services as a sufficient number of restrooms, restrooms for disabled, and the access to potable water.

Educating beach users about potential threats they may face and providing safety tools before visiting the marine venue helps to mitigate potential risks from water sports. Furthermore, the educational boards and the flagging system that are offered by the program will provide necessary information to promote safe behavior and explain alerting signs of the location.

In this context, ASEZA should take a lead position in addressing the safety issue, since firstly public beaches belong to the field of their responsibility, and secondly they have the proper authorization and capacity to do so.

Results

3.17. Field Observation

The following chapter illustrates the field visits conducted for supporting an in-depth view of the research area. This research area contains one exemplary public beach (Area 1) and one private beach (Area 2). They were investigated with regard to their compliance to the Blue Flag standard and potential of application. Accordingly, they have been named "proposed public beach" and "proposed private beach".

3.17.1. Proposed Public Beach (Area 1)



Figure 6 Proposed Public Beach in the Southern Tourism Area
Source: Author

The proposed public beach, shown in Figure 6, lies next to the Aqaba Marine Park at the southern area of the coastline of the Gulf, facing the neighboring city of Egypt. It is popular for diving, swimming, jet skiing and other water sports. The length of this beach is around 300 m and characterized by mixed sand. It is a place frequently visited by local tourists especially over the weekends.

This beach is under the authority of ASEZA and should serve as pilot project site. Functionaries of this local authority, ASEZA, started the discussion about adopting the Blue Flag program at all public beaches of their responsibility. Prior to this research, a

series of water samples covering all required parameters were taken from this beach by ASEZA as a first step of meeting the Blue Flag criteria.

This first series of seawater sampling was conducted by Ben Hayyan laboratories for the period of February 2010 to May 2010. The results of the sampling tests were complied with the required Blue Flag values, as well as with Jordanian standards for bathing water. However, due to the lack of sufficient funding, the seawater sampling has been stopped at this beach.

In terms of meeting the required environmental education and information criteria, no information signs about coastal zone ecosystem, the Blue Flag Program, water bathing quality, or map indicating the required facilities are available at the beach.

Referring to the safety and services criterion, the beach is lacking an official lifeguard, and first aid equipments. There is only one ranger, who is responsible to manage various tasks simultaneously.

Since the beach is under the authority of ASEZA, an emergency plan to cope with accidental pollutions is available. During the time of pollution, precautions measures are taken such as closing the beach and prohibiting people from swimming.

Regarding the environmental management criterion, the beach does have waste disposal bins. Nevertheless, these waste bins are not sufficient to meet the need of tourists especially over the weekends and formal holidays when bather's density is the highest. Thus, the requirement of providing waste disposal bins does not meet the required standards by the program. Furthermore, the beach faces some visual pollution as cigarette remains, plastic and glass bottles can be found at the entire beach. No facilities for the separation of recyclable waste material are available.

The beach is provided with an inadequate number of toilets. No special toilets for handicapped people are present. Unfortunately, the provided facilities are operated with septic tanks and thus hygienic problems due to the lack of sewage system are faced.

ASEZA established a specific place for camping and barbequing. However, during holidays people are not committed to use these specific places and thus generated solid wastes are scattered along the beach.

No specific law or regulation prohibits the access of dogs or other domestic animals to the beach. Nevertheless, it is not allowed for tourists to be accompanied by their domestic animals in this area. According to a ranger of the Aqaba Marine Park, at this beach and further public beaches people use animals such as horses for touristic attraction. This can impact other beach users negatively.

3.17.2. Proposed Private Beach for the Program (Area 2)



Figure 7: Proposed Private Beach in the Northern Tourism Area
Source: Author

The private beach of Figure belongs to a well-known five stars hotel in Aqaba and is located in the heart of the city, close to main shopping streets. It is considered as one of the most favorite beaches for shoppers, who like to combine shopping with water sports and other activities.

This beach is relatively small - around 70 m long - and characterized by artificially arranged fine, white, powdery sand. Water sports at this beach are limited to bathing activities. The conducted field research has revealed that the stakeholders of this certain beach are very much in favor of adopting the Blue Flag Program.

In cooperation with Ben Hayyan laboratories seawater sampling for this beach area has started in May, 2010 and still running for ensuring its compliance with the requested seawater quality criterion. According to the responsible safety engineer of this beach, all seawater tests in the period of May to November were within the allowed limits and thus fulfilled the program´s requirements.

It is notable that this hotel, as the majority of hotels along the Aqaba coastline, is connected to the public sewage system. Hence, no wastewater or sewage related discharges originate from those facilities and would affect the beach’s water quality. Nevertheless, the accidental spillages in 2008 and August 2010 from a nearby damaged sewage system resulted in the temporarily closure of the proposed beach. This action was ordered by ASEZA as a preventive measure to avoid any health risk that could affect tourists or local people (Rayyan, pers. comm.).

According to a senior planner of the ASEZA Planning Division, the connection to the local sewage system is mandatory everywhere in Aqaba to all households and commercial building. Nevertheless, some facilities that had been established prior the release of this mandate are still relying on septic tanks. Most sewage is received and treated by governmental AWWTP, while some private enterprises utilize on-site treatment and re-use the reclaimed water for applications like landscaping.

Complying with the Blue Flag environmental management criterion, the focused beach is visually clean, waste disposal bins, which are maintained regularly, are available. Recently the responsible beach committee signed an agreement with a recycling company

concerning on-site waste separation to fulfill the requirements of the Blue Flag Program under this criterion.

The beach committee consists of one beach operator, the hotel manager, one lifeguard, one environmental safety engineer, and secondary key-people. Together with other relevant stakeholders this committee will continue to be in charge for ensuring the compliance of the hotel's beach with all environmental management criteria. Additionally, they will supervise further duties regarding environmental management.

All sanitary facilities at the beach including toilets, and restrooms are available for beach users and are getting maintained properly.

Furthermore, fulfilling Blue Flag requirements, domestic animals are not allowed at this beach.

Currently, no information signs referring to the present coastal ecosystem - and its approach - and bathing water quality are available at the discussed beach. Nevertheless, those signs are currently under preparation.

Furthermore, no environmental education activities are offered to tourists or locals on the beach site. However, according to the national operator of the Blue Flag Program in Jordan, some environmental activities were proposed to applying beaches.

In terms of the safety and services criterion, a lifeguard is patrolling at the bathing area, as well as first aid equipment is available.

An emergency plan to cope with accidental pollution is available including certain mitigation and precaution measures.

However, the current flagging system indicating the current safety level of the bathing water should be modified in order to comply with the Blue Flag requirements. Table 13 shows the detailed checklist of the two proposed beaches in terms of compliance to the FEE criteria.

Table 13: Detailed Checklist of the Proposed Appling Beaches

No.	Criteria	Public Beach	Private Beach
Environmental Education and Information			
1	**Information about the Blue Flag program must be displayed including of:** -The essence of each of the four categories of the Blue Flag criteria must be explained -The length of the Blue Flag season -Contact details for the local, national, and international Blue Flag representatives should be posted -In the event that the flag is temporarily withdrawn, information must be posted -Information must be in English, Arabic, etc.	Not available	Ongoing
2	**Environmental education activities must be offered and promoted to beach users** -The activities should focus on the environment, environmental issues, Blue Flag issues or sustainability issues -The environmental education activities must be clearly disseminated to the public preferably, the activities should be posted on the common information board	Not available	Some educational activities have been proposed already and will be implemented when applying the program
3	**Information about bathing water quality must be displayed** -It is recommended that a table or figure with identifiable symbols correspond to the results to be displayed	Not available	Information board is still not available but under preparation
4	**Information relating to local eco-systems and environmental phenomena must be displayed** -Information about coastal zone ecosystems, wetland areas, unique habitats or any sensitive natural areas must be displayed at	Not available	Ongoing

	or close to the Blue Flag beach -The information should include details about the natural area and a code of conduct for visitors to the area. If the full information is not available on the Blue Flag information board, there should be at least a short notice on the board informing the public about the nearby sensitive area and where they can find further information		
5	**A map of the beach indicating different facilities must be displayed** -A map showing the boundaries of the Blue Flag beach area and the location of key facilities and services must be posted on the Blue Flag information board. The map should be of good quality, easy to read and properly orientated.	Not available	Ongoing
6	**A code of conduct that reflects appropriate laws governing the use of the beach and surrounding areas must be displayed** -The code of conduct should address the activities of beach users and their conduct on the beach. The beach code of conduct must be displayed on the Blue Flag information board -The code of conduct should include rules about the presence of domestic animals, zoning, litter management, the use of vehicles, camping, fires, etc -Laws governing beach usage and management should be available to the public at the office of the local authority/beach operator -The period when the lifesaving equipment and/or lifeguards, and first aid are available must be clearly marked on the Blue Flag information boards or at the lifeguard station. An explanation of the emergency flag system in	Not available	Ongoing

	use must also be provided		
	Water Quality		
7	**The beach must fully comply with the water quality sampling and frequency requirements** -Ben Hayyan has a comprehensive information regarding water sampling and frequency requirements -The water quality has to be displayed at beach information board	Compiled from February to May,2010 No information board	Compiled from May to November,2010 No information board
8	**The beach must fully comply with the standards and requirements for water quality analysis**	Compiled with the restrictor value of each parameter	Complied with the restrictor value of each parameter
9	**No industrial, wastewater or sewage-related discharges should affect the beach area** -Whenever the beach affected by sewage, the manager should inform the national Blue Flag operator (JREDS)	No industrial sewage affect the beach	No industrial sewage affect the beach
10	**The beach must comply with the Blue Flag requirements for the microbiological parameter faecal coli bacteria (E.coli) and intestinal Enterococci/Streptococci**	During the time of sampling, the results were complied	During the time of sampling, the results were complied
11	**The beach must comply with the Blue Flag requirements for the following physical and chemical parameters:** -The pH value range is normally 6 to 9 -There must be no oil film visible on the surface of the water and no odour detected -On land the beach must be monitored and emergency plans should include the required action to take in case of oil pollution -There has to be an absence of floatables such as tarry residues, wood, plastic articles, bottles,	During the time of sampling the results were complied with the Blue Flag requirements	During the time of sampling the results were complied with the Blue Flag requirements

	containers, glass or any other substance		
	Environmental Management		
12	**The local authority/beach operator should establish a beach management committee** -The beach management committee would be charged with ensuring compliance with all environmental management criteria**.** The committee should consist of hotel manager, beach manager, and lifeguard	Not available	Available
13	**The local authority/beach operator must comply with all regulations affecting the location and operation of the beach** -Regulations relating to coastal zone planning, environmental management, wastewater legislation, environmental legislation, and others must be met for the beach to receive and maintain Blue Flag status	Available/ nevertheless, restricted zoning is required	Available
14	**The beach must be clean**	Relativly clean	Clean
15	**Algae vegetation or natural debris should be left on the beach.**	Collected and received by ASEZA	Collected and received by ASEZA
16	**Waste disposal bins/containers must be available at the beach in adequate numbers and they must be regularly maintained**	Available/not adequat number	Available/adequate number
17	**Facilities for the separation of recyclable waste materials should be available at the beach**	Not available	An agreement was signed with recycling company, that works on waste separation, also three additional waste bins will be available and marked at the beach for tourists to separate their waste
18	**An adequate number of toilet or restroom facilities must be provided**	Available/not adequate	Available/adequate
19	**The toilet or restroom facilities must be kept clean**	Not maintained properly	Maintained regulary

20	**The toilet or restroom facilities must have controlled sewage disposal**	Septic tanks only	Sewage connected to municipal wastewater network
21	**On the beach there will be no unauthorised camping or driving and no dumping**	Authorized driving/ Nevertheless there is some unauthorized campaigns/dumping on this beach	There is no unauthorised camping/driving/dumping
22	**Access to the beach by dogs and other domestic animals must be strictly controlled**	People do not follow ASEZA's rules	Not allowed at all
23	**All buildings and beach equipment must be properly maintained**	Not properly maintained	Applicable, Done
24	**Coral reefs in the vicinity of the beach must be monitored**	Available/under ASEZA control	There is no coral reef in the vicinity of the beach
25	**A sustainable means of transportation should be promoted in the beach area**	Not available	Private beach, information about public transportation is available. Shuttle Bus is available
	Safety and Services		
26	**An adequate number of lifeguards and/or lifesaving equipment must be available at the beach** -Lifeguards must have appropriate national or international qualifications. -Lifeguards should only be employed for lifeguarding and not in combination with duties such as water sports, rentals and services, cleaning or other duties -Lifeguards must be easily recognisable. It is therefore recommended that lifeguards wear the internationally recognised red/yellow uniform. Lifeguards must be provided with appropriate lifesaving equipment -Bathing areas patrolled by lifeguards should be clearly marked out. The area should be defined on the map, at information points and/or physically on the beach with	Not available	Available

	markers or flags		
27	**First aid equipment must be available on the beach** -The first aid may be available by means of a) A lifeguard on site, and/or b) An attended first aid station with trained personnel, and/or c) Equipment located in a shop or other beach facilities at the beach, and/or d) Directly available to the public on the beach. It is strongly recommended that busy beaches and family beaches have first-aid stations with staff in attendance. First-aid personnel must have appropriate qualifications.	Not available	Available
28	**Emergency plans to cope with pollution risks must be in place**	Available	Available
29	**There must be management of different users and uses of the beach so as to prevent conflicts and accidents**	Not available	Available
30	**There must be safety measures in place to protect users of the beach**	Not available	Available
31	**A supply of drinking water should be available at the beach** -There should be a potable water source on the beach, e.g. from pipe, tap, etc. This source can be in the restroom/toilet block or on the beachfront but it must be protected from contamination by animals	Available	Available
32	**At least one Blue Flag beach in each municipality must have access and facilities provided for the physically disabled**	Not Available	It is not a must for private beach.

Observations at both proposed beaches verify that neither the proposed public nor the private beach is ready to be certified yet. Nevertheless, both beaches have the potential to apply for the program since they fulfill the fundamental criterion of water quality standards compliance.

Regarding further criteria it can be clearly seen that the proposed private beach has the potential to meet the environmental management and safety criteria easily, while public beaches struggle of fulfilling those. This might be related to the lack of staff and financial resources, as well as an appropriate level of consciousness and will to do so. The environmental education criterion is generally poor in both, public and private beaches and must be improved for meeting the requirements.

Generally it can be stated that users of private beaches are in a much better financial position than users of public beaches. Hence, the re-allocation of financial resources in form of an eco-tax from private to public beaches might provide the financial basis to enhance the compliance of all applying beaches to Blue Flag standards. Hence, the will for enforcement needs to be fostered at the same time.

Under the umbrella of this vision, a questionnaire was distributed among two private beach users.

Table 14 shows the categorization of participants of the conducted questionnaire by nationality and age.

Table 14: Categorization of Participants by Age and Nationality

Age	Nationality				
	Jordanians	**Arabs**	**Europeans**	**Others**	**Total**
15-25	6 (21%)	2 (11%)	3 (5%)	1 (5%)	12 (9%)
26-35	9 (32%)	8 (45%)	28 (43%)	5 (26%)	50 (39%)
36-45	10 (36%)	5 (28%)	16 (25%)	9 (47%)	40 (31%)
46-55	2 (7%)	3 (16%)	8 (12%)	3 (16%)	16 (12%)
>55	1 (4%)	0 (0%)	10 (15%)	1(5%)	12 (9%)
Total	28 (22%)	18 (14%)	65 (50%)	19 (14%)	130 (100%)

The discrete count is shown for each sub-category. Percentages next to those indicate the share of this sub-category hold compared to the total count of the specific category. The last row of Table 14 states the total counts of each category. The percentages presented next to the total counts indicate the share that a certain group holds compared to the total questioned with n = 130.

The sub-category of Arabs for instance, of the age of 15-25 counts 2 members. Thereto, those pose 11% of all questioned Arabs. The category of Arabs counts 18 people and thus has a share of the total questioned group of 14%.

The nationalities of tourists were classified in four categories. Since living conditions of local tourists differ significantly from the condition of tourists from other Arabic countries the categories of “Jordan” and “Arabs” were set up.

European tourists are generally more familiar with eco-labels as well as “eco-taxes” basically used for mitigating the environmental impacts caused by tourism. Therefore,

European tourists were put in one category. Tourists who are mainly from Mexico, South-Africa, Canada, and Brazil were grouped as category “Others”.

As Table 14 further prevails the most dominant categories were from relatively young people (26-35) which represents 45% of Arabs and mid-aged people (36-45) which represents 47% of people with European nationality. Nevertheless, the illustration shows the heterogeneity of the questioned group referring to different ages and various categories. The proportion of tourists by home country is recorded with 22% of Jordanian nationality, 14% different Arabs, 50% from Europe, and 14% Others (Mexico, South-Africa, Canada, and Brazil). This distribution makes the majority of tourists spending their holidays in these five star hotels being non-Arabs. The following figures illustrate the results of the conducted questionnaire.

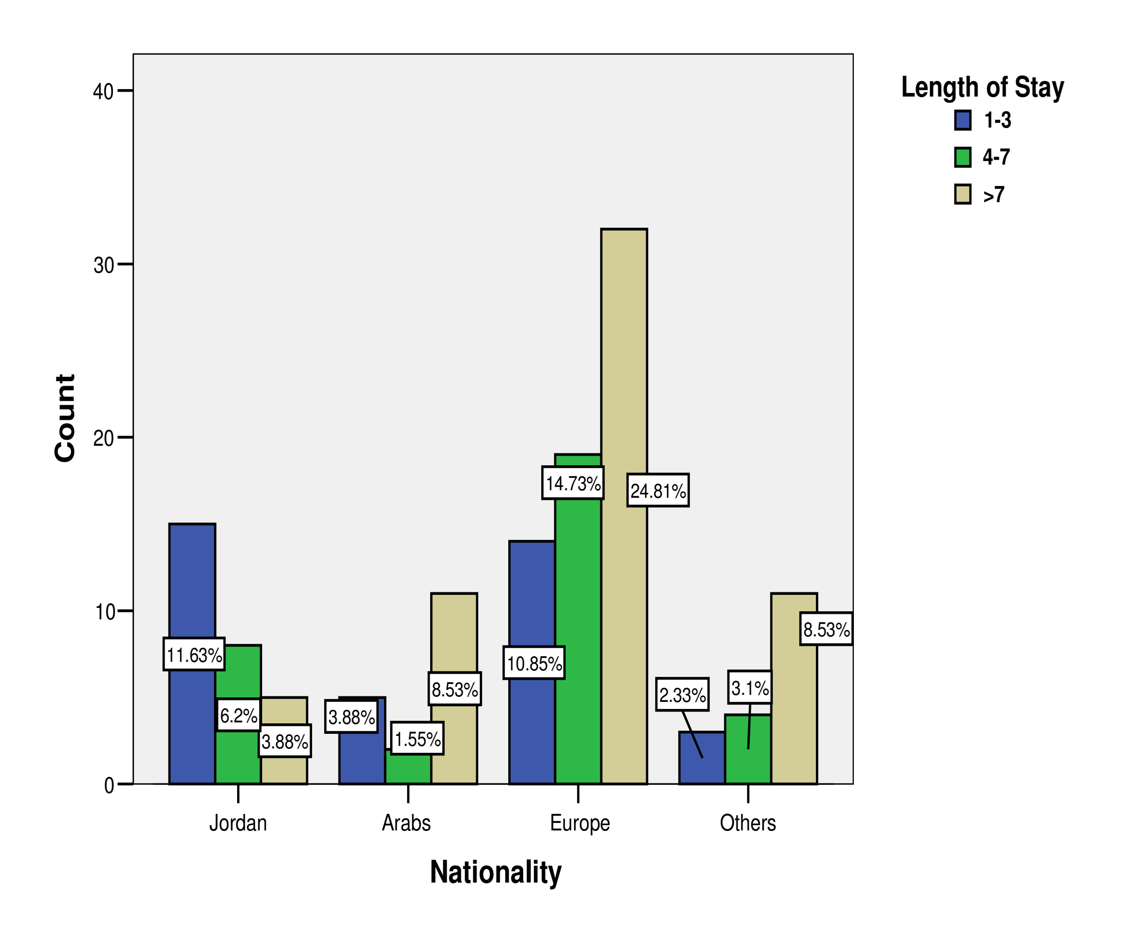


Figure 8: Length of Stay According to Nationality

Figure 8 shows the length of stay according to the nationality of tourists. At the Y-axis the discrete counts are displayed, while the X-axis shows the four different categories. Each category is divided in several columns that vary in color. The specific colors are further explained in the legend of the figure placed on the right side. In addition to the discrete count indicated by the height of each column, percentages have been added. Those depict the share of each indicated sub-group compared to the total number of conducted questionnaires, n = 130. The sum of the percentages of all sub-categories equals 100%, while the sum of all discrete counts is 130.

The length of stay of tourists with Jordanian nationality is rather short (1-3 days) which represents 11.6% of the total number of questioned people. This could be rooted in the proximity of their residence to the concerned hotels. They might perceive their stay rather being a weekend trip than holidays and hence, extension of their stay might be limited.

From the figure it be clearly seen that Arabs from neighboring countries who represents 8.5%, Europeans 24.8%, and Others 8.5%, prefer to stay more than one week at Aqaba. The length of stay might reflect the distance to their residence.

It can be concluded from this figure that expected tourists from abroad stay longer than local tourists and they purposely select Aqaba as destination for their holidays. Hence, they should be attracted in the future to make the same choice again or recommend the destination to other tourists. Conversely, local tourists might have chosen Aqaba as their holiday destination due to proximity/closeness from their residence. Nevertheless, offering high quality environment accompanied with good services as promotion are needed for attracting local tourist as well. While the duration of their stay might be possibly not extended, the frequency of their weekend trips might be raised, yet.

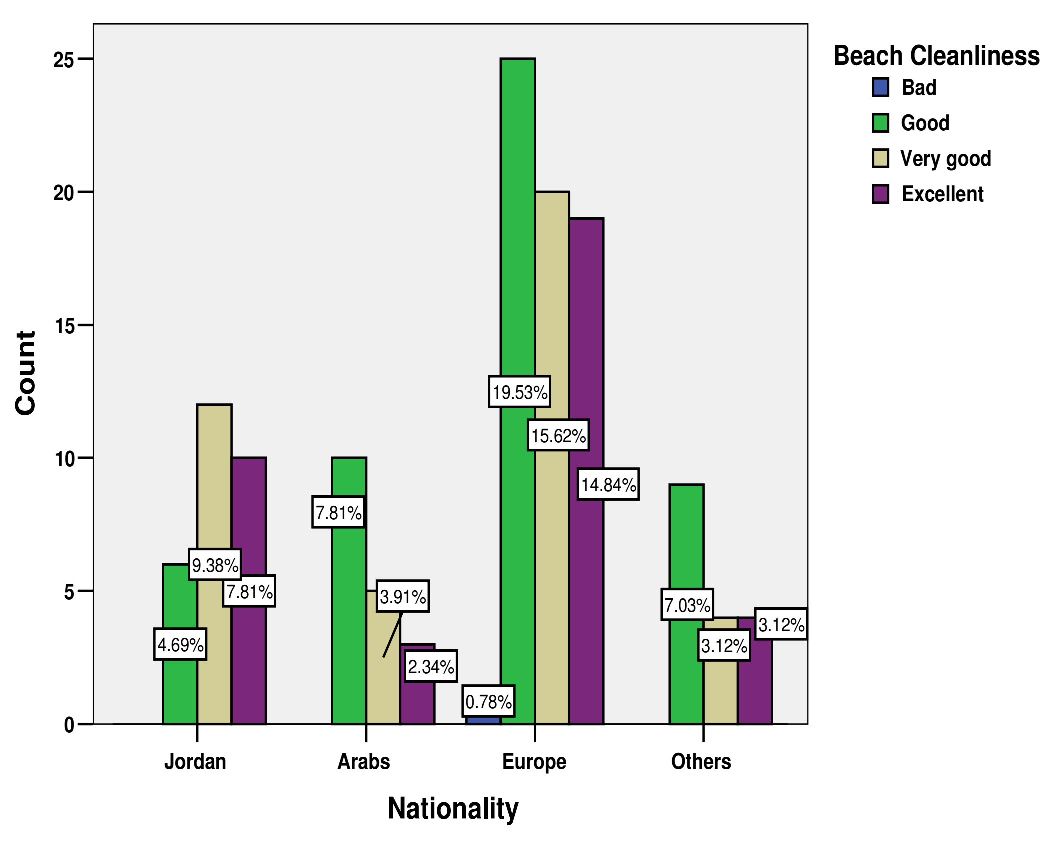


Figure 9: Tourists´ Opinion on Beach Cleanliness

Figure above shows the result of how tourists rate the level of satisfaction with regard to the private beach cleanliness. The majority of Jordanians, 9.4% of the total, rated the cleanliness (litter and waste) at these private beaches as “very good”, whereas the majority of Europeans 19.5%, Arabs 7.8%, and other tourists 7%, rated the same beaches only as “good”. More than a quarter of all questioned tourists (28.1%) rated beach condition as “excellent”. Meanwhile, the description as “bad” is negligible (0.8%). Thereby, the high level of satisfaction of questioned beach users is reflected.

The level of cleanliness of these beaches is complying with the Blue Flag standards. Correspondently, its cleanliness is recognized by beach users as “good” to “very good”. Thus, the perception of beach users is in line with requirements of the Blue Flag standards for good bathing conditions.

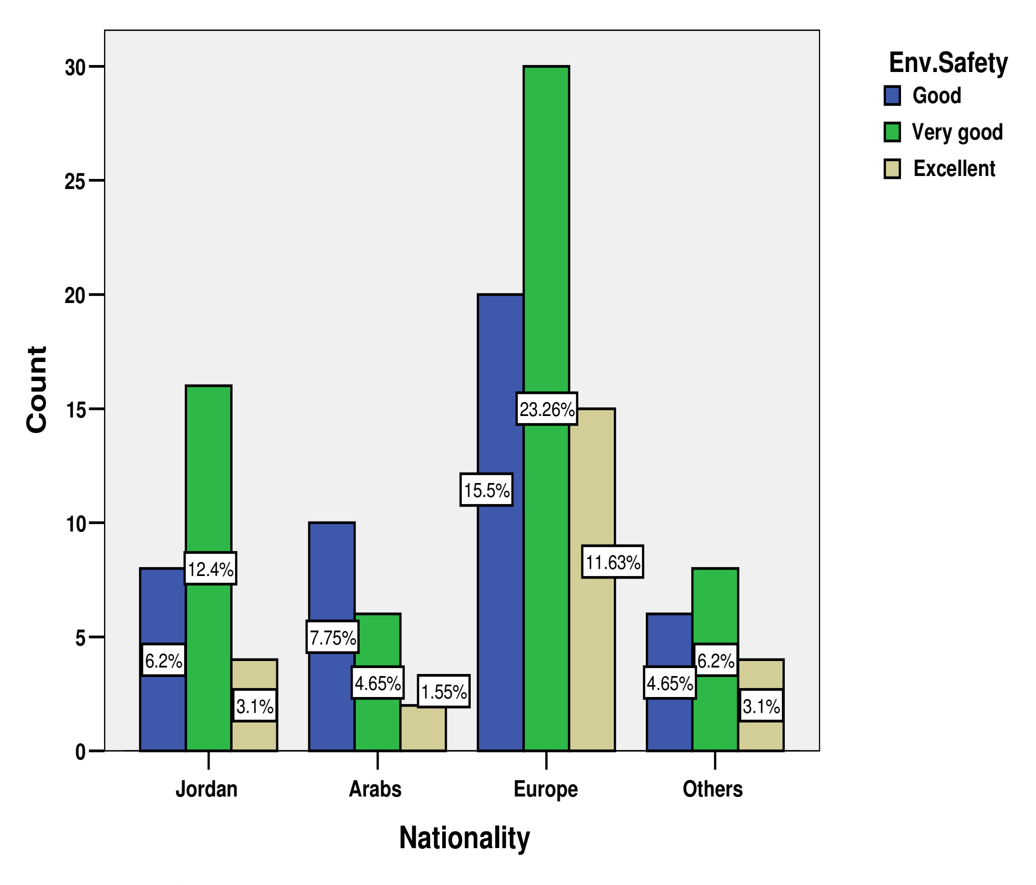


Figure1 0: Tourists´ Opinion about Present Environmental Safety

The question reflected by Figure1 aimed at getting a feedback from tourists regarding environmental safety concerns, which refers to the accessibility of safety equipment, first aid, and supply of drinking water. These elements represent the major criteria of the safety and services criterion required by the Blue Flag Program. The response of this question was positive without any exceptions. Accordingly, tourists rated the environmental safety as "good" by 34.1%, as "very good" by 46.5% and as "excellent" by 19.4%.

Three further questions related to the Blue Flag´s safety criterion were examined in the conducted questionnaire. These aimed at elaborating the level of satisfaction in terms of toilets and restrooms facilities, the maintenance of buildings, and eco-friendly transportation. The ratings given to these three questions were varying from 57.5% "excellent", 53.2% "very good", and 51.6% "good" respectively.

The question which refers to eco-friendly transportation attempts particularly to access the availability of shuttle busses or other public transportation to reach beaches. However, since the beaches are directly connected to the hotel area, this question caused confusion and thus was not answered accordingly. It can be stated that environmental safety measures of researched beaches fulfil the Blue Flag standards and are perceived by tourists as fully sufficient.

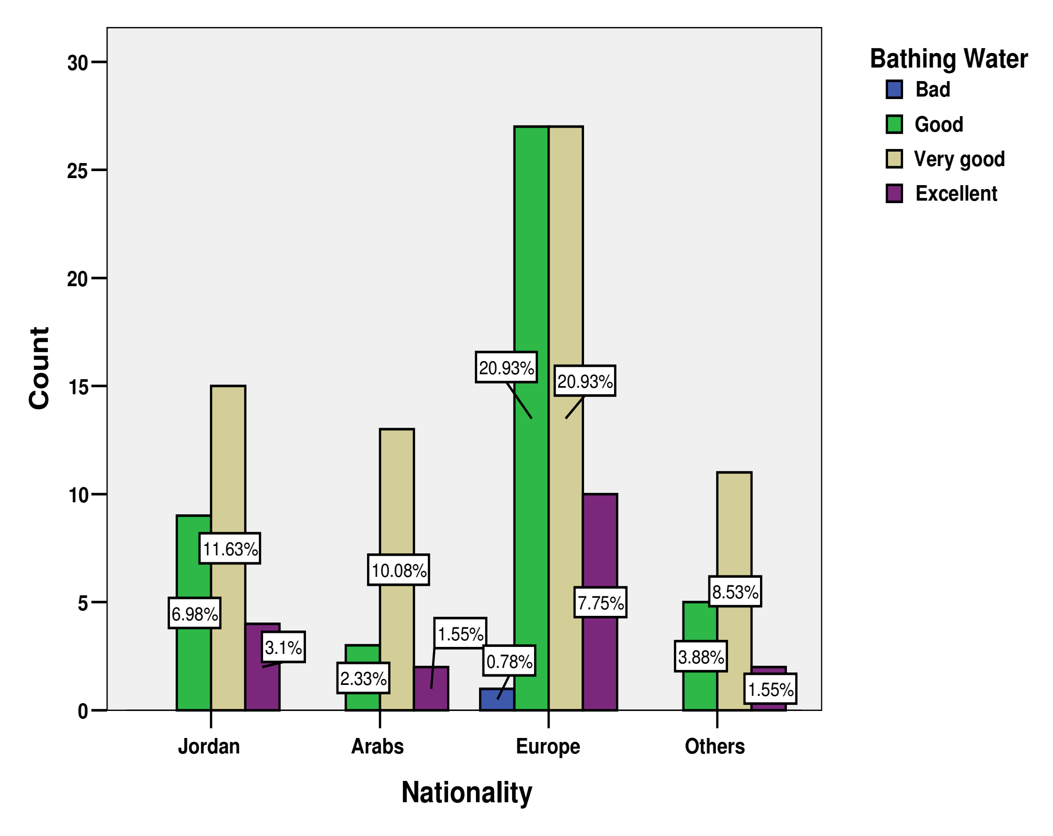


Figure 11: Tourists´ Opinion on Bathing Water Quality

Figure shows the results of tourists´ opinion regarding the bathing water quality. Indicators as color and odor of seawater were examined. These criteria cover the visual tests of the water quality that are required by the Blue Flag Program. Tourists confirmed the beach owners' opinions and the water quality tests that have been taken by Ben Hayyan laboratories. In total, bathing water quality has been rated as "very good" by 51.2%. A minor percentage (0.8%) of European tourists rated the bathing water as bad. This negative rating could be related to some accidental spillage of sewage. However,

such accidental spillages are on very low frequency and thus the last incident dates back more than two years. Nevertheless, without this depressing influence, bathing water quality was depicted as dominantly “very good”. Hence, tourists’ perception is in line with the Blue Flag standards.

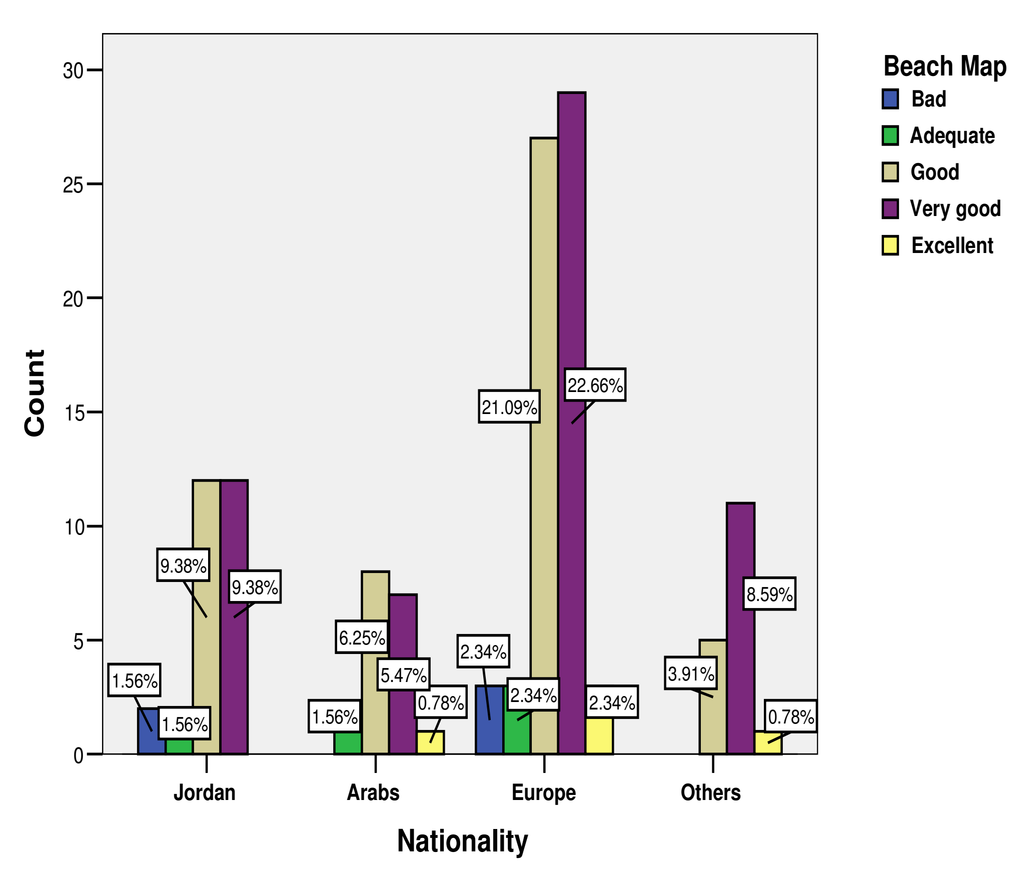


Figure12: Tourists´ Opinion on Environmental Education

Figure shows the rate of satisfaction concerning environmental education. The discussed beaches lack the environmental information required by the Blue Flag standard about water quality and eco-system environment. Nevertheless, the beach manager provides maps indicating the facilities at the beach and informing about bathing water temperatures. Grading of individuals differs significantly from each other and all five possible levels have been chosen, from “bad” to “excellent”. Nevertheless, the majority of tourists which represents 46.1% rated these maps as a “very good” tool of information. However, provision of information must be improved by displaying the requested signs in

order to be in line with the Blue Flag standards and to satisfy more guests to greater extent.

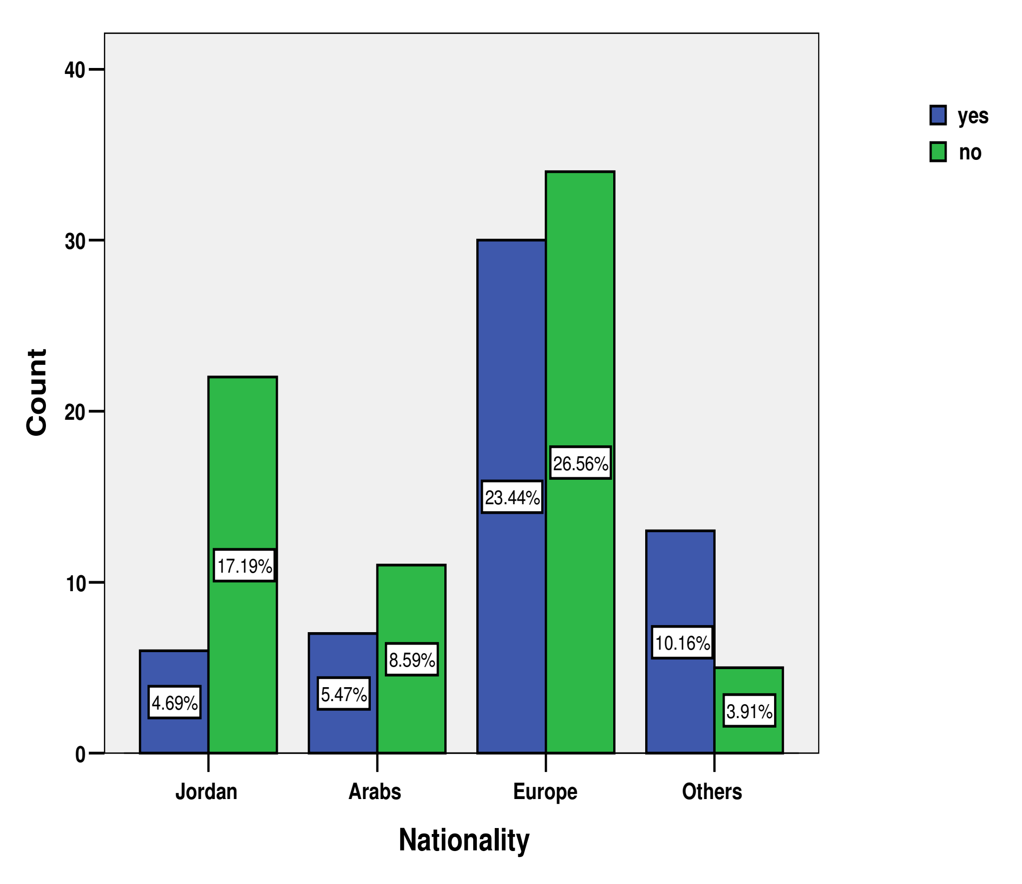


Figure13: Awareness of Blue Flag

Figure shows the results of the question that aimed at evaluating on tourists´ awareness of the Blue Flag Program. It can be clearly seen that majority of Jordanians 17.2%, 8.6% Arabs, and even Europeans tourists 26.6%, of total counts do not know about the program. The overall percentage of tourists unaware of the Blue Flag Program is 56.2%. Only a majority of the category “Others” 10.2%, of total counts could state such knowledge about this program. However, a considerable percentage of 43.8% of questioned people have heard about the program before. Nevertheless, the result indicates need for further environmental education and raising awareness among beach users and other associated stakeholders.

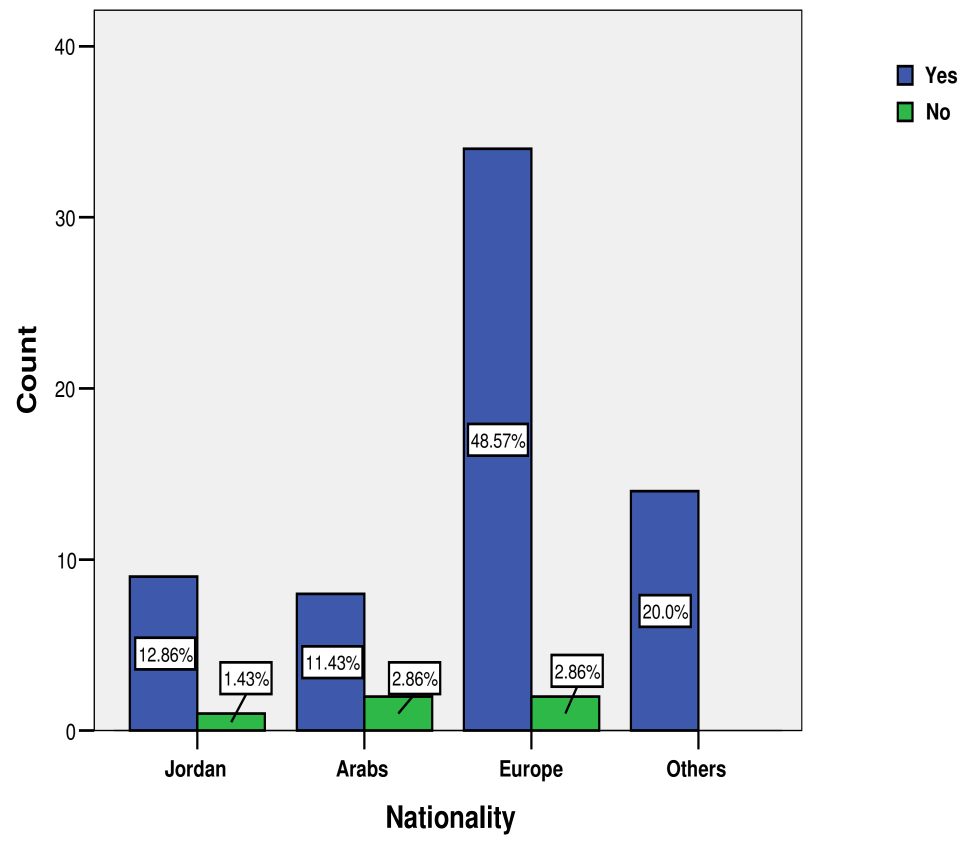


Figure 14: Preference of Blue Flag Eco-Award Beaches

Figure shows the results of the question evaluating on the preferences of spending their holidays on a Blue Flag eco-awarded beach. Even though unawareness about the Blue Flag Program was expressed by the majority in the previous question, the vast majority which represents 92.9% of tourists from different categories stated the preference of Blue Flag eco-label awarded beaches. This indicates that although people are not aware of the existence of the Blue Flag Program and its exact design, eco-labelling seems to be so attractive that only naming the award without mentioning criteria is convincing enough for tourists regardless their home country. By that, the economic attractiveness of eco-labelling is reflected and the mutual benefit derived from connecting economic interests to environmental improvements and concerns, is underlined and becomes apparent.

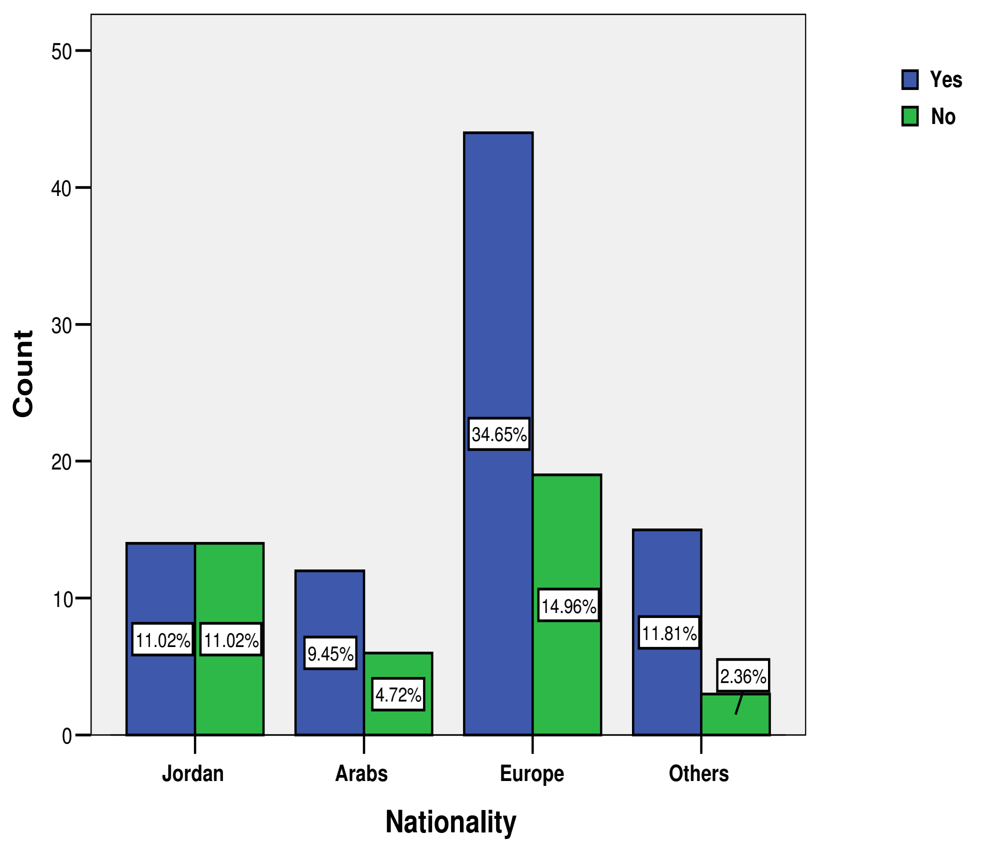


Figure 15: Tourists´ Willingness of Paying an Eco-Tax

Applying the Blue Flag Program is free of charge for tourists. Nevertheless, an additional eco-tax may help to re-allocate financial resources from private to public beaches. Thus, with more monetary capacities, facilities at public beaches could be improved and hence apply for the program as well. Figure states the proportion of tourists according to their home country and illustrates their willingness of paying an additional eco-tax. However, among Jordanians readiness to pay was in balance with those who rejected the idea of an additional fee. Moreover, many Jordanian tourists commented on the questionnaire sheet: “Enough taxes”!, or “For what this tax will go for?!”. A slight majority of Arabs are willing to pay 9.5% of total counts. It should be mentioned that the average income of countries where most of the Arabs asked for their opinion by this survey came from, is better than in Jordan. The percentage of European people who are ready to pay this tax is at 34.7% of total counts relatively high. This can be justified with a Europe-wide good

average income and a high rate of being generally familiar with eco-labelling. Consequently, it can be stated that “European tourists are easily willing to pay an “eco-tax” since they are familiar with eco-labels, while Arab tourists might be having some reservations”. It can be clearly seen that the majority of tourists in total 66.9%, expressed their willingness to pay. Overall, the feasibility of the eco-tax collection is documented by the answers given. Such fee could form a possible source of fund generation in fostering environmental mitigation measures and related initiatives.

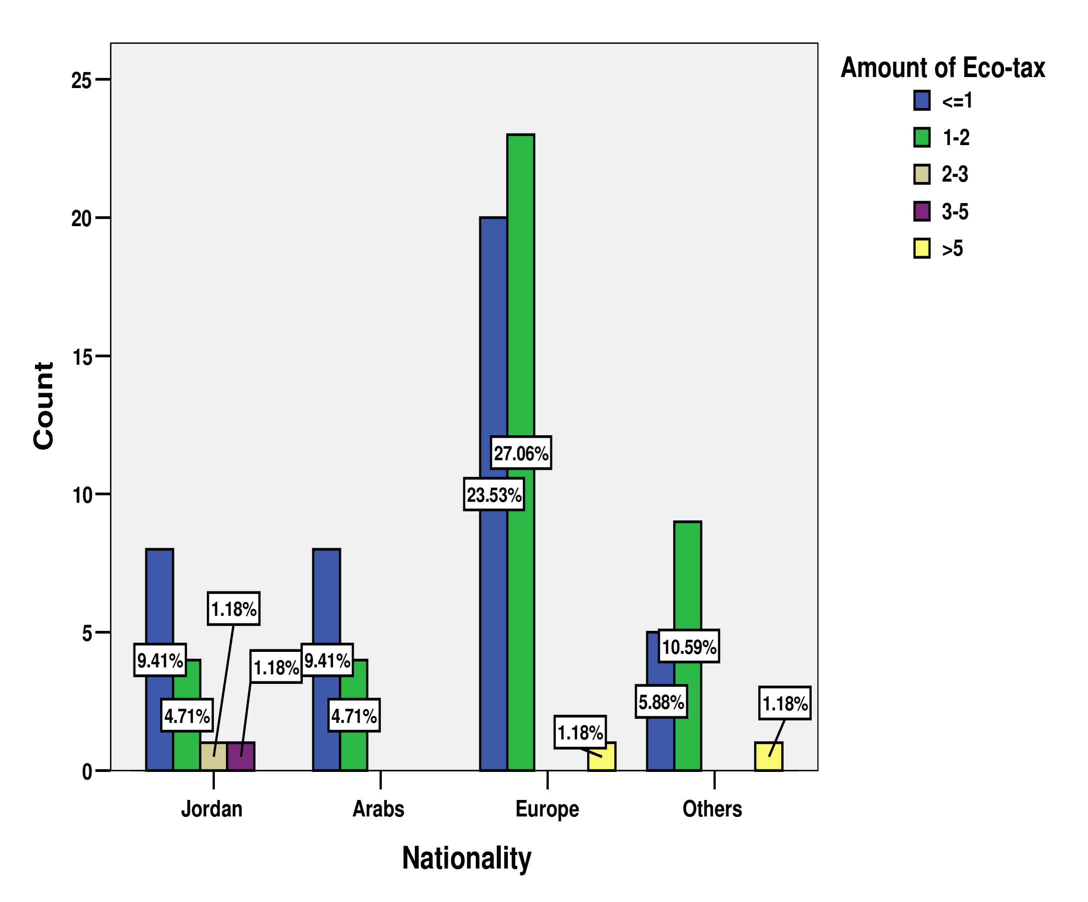


Figure 16: Amount of Eco-Tax per Day

Figure 16 illustrates results of the final question referring to the potential amount of an eco-tax participants are willing to pay. This was a contiguous question and consequently answered by those who gave a positive response to the willingness to pay an additional fee. Most of those being questioned (48.2%) decided for the lowest category and want to

pay less than 1 US $ per day. Furthermore, a high number of 37.6% is ready to pay 1-2 US $, and some (2.4%) are even willing to pay more than 5 US $ per day.

3.18. Scenario of Eco-Tax Collection

Based on results of the conducted survey and information collected at focused private beaches following rough calculations, have been established.

High season is considered from May to September. During that time 500 beds are booked at each hotel on average/day. Accordingly, low season lasts from to October to April. On average 150 beds are booked /day per hotel during that time. Within the total addressed region, six hotels have access to private beaches. Referring to the results of the evaluated questionnaire, the possibly collected eco-tax has been set on a rate of 1 $ per day during high season and assumed 0.5 $ during low season. During high season beaches are used at higher frequency and thus the necessary mitigation and prevention measures are expected to need greater effort. Consequently, this should be reflected in the amount of eco-tax collected.

Accordingly, for the period of high season an amount of 450,000$[7] could be collected on average. During low season an average amount of 189,000$[8] is estimated. In total this possibly 634,000$ could pose a real re-allocation of financial resources and should be used for gaining major achievements for establishing facilities at public beaches. Hence development towards the compliance to Blue Flag standards of public beaches can be enhanced substantially.

[7] High season: 5 months x 30 days x 500 booked beds/ day/ hotel x 6 hotels x 1$ = 450,000 $

[8] Low season: 7 months x 30 days x 150 booked beds/ day/hotel x 6 hotels x 0.5$ = 189,000 $

Conclusion

Jordan's coastline is unique and hosts a vast variety in its biodiversity. Nevertheless, this coastline is increasingly set under pressure by tourism and other marine uses. Therefore, the local authority of ASEZ must balance interests and facilitate a sustainable development of arising demands.

According to Petra News Agency (2007), the Arab Tourism Ministers' Council has chosen Aqaba as the 2011 Arab Tourism Capital following Alexandria that was announced for the year 2010. In this context, major investment in the tourism sector is expected for the upcoming years. However, an integrated coastal zone management is essential for preventing this decoration turning into a burden.

The implementation of the Blue Flag Program enhances sustainable tourism in Aqaba and allows the prevention of negative impacts on marine environment of the Gulf of Aqaba by the tourist industry. Consequently, effects as illustrated in chapter 3.3 could be mitigated.

The Blue Flag eco-label is one of many tools and factors which can facilitate the coastal zone management. Thereby, it can be a tool for balancing needs for economic development with the need for protecting the natural resources. Adopting the program in Aqaba will reflect a modern and ever advancing port city in the Middle and Near East that is serious about its environmental responsibilities and one that tourists would desire to visit. It is expected that good environmental practices would become "contagious" throughout the immediate region. Aqaba prides itself on being a natural combination of unique environmental dynamics, with the arid mountains and unusually beautiful coast separated only by a cultural archaic, yet modern city. These existing benefits, coupled with region wide environmental care, are a recipe for not only significant increase in tourist numbers but also multiple returns.

By applying the Blue Flag Program, Aqaba would give the best example for the neighboring countries by using a sustainable tool to reserve its coast and will open more

channel for international cooperation and exchanging the experiences. However, none of the neighboring countries has adopted any beach eco-labeling so far. Hence, by introducing the Blue Flag Award, Jordan could set standards for the entire region of the Gulf.

Aqaba has sufficient standards and regulations to protect its coastal zone. Furthermore, Aqaba's environmental policies and regulations comply with the requirements as set by the feasibility study of the Blue Flag Program. This is expressed by the compliance of water quality tests results with the given standards. This compliance is considered as an achievement since the water quality criterion is the limiting factor for many applying countries. However, for a sufficient management of coastal zones, efficient regulations for coordinating interests of different marine users are still not fully implemented.

The evaluation of the local framework revealed that ASEZ provides all institutions and organizations that are needed for a successful implementation of the Blue Flag Program. In this context, responsibility regarding water monitoring and sampling can be taken over by the local Ben Hayyan laboratories and the Marine Science Station (MSS). Furthermore, the non-governmental organization of Royal Marine Conservation Society of Jordan (JREDS) could contribute in-line with their on-going projects to the aspects of environmental education. In addition, JREDS has already been announced as national operator of the Blue Flag Program. The criteria of safety and services and environmental management could be facilitated by the local authority of ASEZ. In this context, ASEZA takes a key position in the implementation of the Blue Flag, since it holds responsibility over all public beaches and all issues of public concern. Eventually needed funding could be provided by the Aqaba Development Cooperation (ADC).

The Ministry of Tourism and Antiques (MoTA) and the Ministry of Environment (MoE) could take up the Blue Flag Program in their agenda and thus promote the award at national and international level.

The compliance of water quality to the Blue Flag standards is the factor that is preventing most applicants from accreditation. However, water samples taken during this research and records reviewed of recent years reveal a full compliance to the requirements. Only two accidental spillages of sewage into the Gulf within the last two years posed an exception. Nevertheless, corrective actions improved water quality and thereby reaching values within limits in shortest time.

The assessment of the situation of the proposed beaches revealed that private beaches comply already with most of the required Blue Flag standards. However, necessary segments of the mandatory environmental education criteria must be further supplemented for reaching full compliance.

Contrarily, public beaches lack substantial elements for complying with categorized mandatory criteria of the Blue Flag except the water quality criterion.

However, since both areas offer a very good water quality, the basic and for some applicants the most challenging precondition for accreditation is fulfilled.

Interviews have been conducted with members of the local community, ASEZA, MSS, Ben Hayyan, JREDS, and the Royal Marine Navy. Their possible stake and involvement in the eventual implementation of the Blue Flag Program has been identified by that. All possible stakeholders expressed their positive perception towards the introduced eco-label and further confirmed their support of an implementation. Not all respondents can be categorized as actual decision makers. Nevertheless, brought support at all levels is the important basis for a successful realization of the program.

The questionnaire conducted at two private beaches of five stars hotels revealed a high level of satisfaction with beach facilities and cleanliness. The group of respondents consisted mainly of international tourists and only to a minor share of local, Jordanian tourists. Besides assessing an insight view of the tourist's perspective, the questionnaire further revealed that only the appearance of an eco-label is highly attractive to tourists. Although respondents were not informed about criteria and regulations the Blue Flag is containing, the vast majority expressed their preference of eco-label awarded beaches to classical beaches. In addition, the hypothesis of "European tourists are easily willing to pay an eco-tax since they are familiar with eco-labels, while Arab tourists might be having some reservations" could be verified. Overall, the willingness of the majority of respondents, regardless their nationality, to pay an additional daily eco-tax could be detected.

The introduced eco-tax is designed to be a tool for the re-allocation of financial resources from private to public beaches. A yearly amount of 634,000 $ is estimated, if guests of the six established five stars hotels pay 1 $ per day during high season and 0.5 $ per day during low season.

Thereby, a financial basis for enhancing the compliance of all applying public beaches to Blue Flag standards shall be provided. Facilities and services that would otherwise not be feasible at public beaches could thereby be installed.

The research highlighted that private beaches are in far better conditions than public beaches. They are limited by only minor constraints to apply for the eco-label on the spot.

Main constraints for the Blue Flag implementation at public beaches are from financial nature. They lack financially intensive facilities like an adequate number restrooms and life guards, etc.

However, cost reduction of the Blue Flag's implementation could be achieved by reviewing current sampling procedures, and focusing on avoidance of unrequested tests.

The introduction of the proposed “beach sampling form”, that has already been adopted by ASEZA supplements expensive testing and thus reduces costs. This form has been adopted without any hesitation and is seen as the initial step taken in the process of reviewing current seawater monitoring procedures.

With the introduction of the proposed eco-tax financial constraints towards the implementation of the Blue Flag at public beaches can be overcome.

Water qualities of all proposed areas fulfill the Blue Flag standards. Thereby, if responsible institutions and organizations are mobilized, the applicability of the Blue Flag Program at the coast of Aqaba is given without exception.

Recommendations

As next steps towards the implementation of the Blue Flag Program, a further survey, similar to the one conducted, should be held. The representative sample size for fulfilling the criteria of a confidence interval of 3% and a confidence level of 95% should be kept. This implies a number of 1056 valid samples. This should document the support and demand of an eco-label like the Blue Flag Award.

In addition, an in-depth evaluation of the criteria of environmental management, environmental education, and safety and services should be performed.

An Assessment of costs for achieving the required standards for public beaches should follow. Correspondently, a selection of first applying public beaches should be done.

Workshops should be conducted to familiarize possible stakeholders with the Blue Flag Program, its benefits and possible duties.

Cooperation between MSS and Ben Hayyan laboratories should be established. Since both institutions are working in the field of bathing water monitoring, by cooperation cross-checking mechanisms should be installed while work duplication is aimed to be avoided. Furthermore, laboratories in cooperation with ASEZA and the national

coordinator must review current water sampling procedures and adopt best practices.

As private beach users expressed their willingness of paying an additional eco-tax a considerable amount of money could be collected. This should be used for investments into public beaches and their compliance to the Blue Flag standards.

However, the collected money should be spent efficiently. In case that not the full sum is needed for direct beach projects, it should be invested in further supporting measures like activities that are in line with the Blue Flag criteria of environmental education.

In addition to increase transparency and enhance the positive perception of tourists towards the eco-tax, the exact amount and purpose of the collected fee shall be displayed on the regular invoice tourists receive from the hotel. Furthermore, the invoice should provide addresses of where to assess further information about the Blue Flag Program.

Declaration of Authorship

Name Hotaf Yassien

Matr. No.: 8090902 (JU), 11073746 (Cologne University of Applied Sciences)

I, Hotaf Yassien, declare hereby on oath that this Master Thesis in hand has been made independently and without the help of any other than acknowledged.

The thoughts taken directly or indirectly from external sources are made recognizable as such. This thesis was not presented to any other examination authority either in the same or similar form and till now it has not been published.

Amman, Signature

I do further agree to a later publication of this Master Thesis, may it be in parts or entirely within the ITT publications or within the scope of the ITT□s public relations.

Signature

References

Alawneh, Z. and Lhier, C. (2006), Reducing Conflicts in the Jordanian Gulf of Aqaba, A review: **Journal of Economy**, 22(1), 389-403.

Al-Bashir, B. (2008), Sharing of Integrated Coastal Zone Management (ICZM) Experiences, **Jordan Report on ICZM** , Aqaba, Jordan.

Al-Husseini, D. (2001), Aqaba's Old Town: Proposed Model for Community Development within the Aqaba Special Economic Zone. **Published Master Thesis,** Massachusetts Institute of Technology, Cambridge, USA.

Aliraja, S. and Rughooputh, D. (2004), Towards Introducing The Blue Flag Eco-Label In SIDS: The Case of Mauritius, Faculty of Science, and University of Mauritius. Marine Science, **Ecosystems and Environment**, 8(1), 1-13.

Al-kailani, M. (2008).Evaluation of Environmental Management and Impacts of Development in Aqaba.(2008).**Unpublished Master Thesis**, University of Jordan,Amman,Jordan.

ASEZA (Aqaba Special Economic Zone Authority), Retrieved November, 10, 2010 from **http://www.aqabazone.com/pages.php?localist_branchname=Aseza**

ASEZA (Aqaba Special Economic Zone Authority) (2001), **ASEZA Design Guidelines**, Vol.20.

ASEZA (2009) **Advanced Assessment** of Land-Based Activities Affecting the Coastal and Marine Environment of Jordan, 26, 217-222.

ASEZA/PERSGA/UNEP, (2009). **Jordan's National program of Action (NPA)** for the protection of the Marine Environment from Land-Based Activities.

Assessment of land Based Sources and Activities Affecting the Marine Environment in the Red Sea and Gulf of Aqaba (2005).UNEP, **Environmental Assessment Review**,(26),221– 241.

Badran, M. Manasrah, R. and Rasheed, M. (2006), Seawater seasonal changes at a heavy tourism investment site on the Jordanian northern coast of the Gulf of Aqaba, Red Sea. **Chemistry and Ecology**, 22(5), 425–435.

Blue Flag Beach Criteria and Explanatory Notes, 2010 **http://www.blueflag.org/Menu/Criteria/Beach+Criteria/Beach_Criteria_Explanatory_Notes_2010.pdf**

Borregaard, C. Nicola,H. and Annie, R.(2005), **Challenging preconceptions about trade in sustainable products Review**, Towards win-win-win for developing countries, International Institute for Environment and Development, London.

Borrego, J. Morinigo, A. de Vincente, A., Cornax, R. and Romero, P. (1995), Enteroccoci as an indicator of fecal pollution in water, its relationship with indicators and pathogenic microorganisms. **Water Bathing Review**, (21), 511 –535.

Decoster, John (2004). Data Analysis in SPSS. Retrieved December, 10, 2010 from **http://www.stat-help.com/notes.html**

Department of Statistics (DOS), Retrieved November, 25, 2010 from **http://www.dos.gov.jo/dos_home_a/main/index.htm**

Dijk,J,(2009).Implementation of the Blue Flag Program, Key Issues and Concerns, **Published Master Thesis**, NHTV Breda University of Applied Sciences.

Doyle, D. Tunnicliff, B. Brickler, S. and Sinclair, A.(1993). Anaerobic incubation of membrane filter cultures for improved detection of fecal coliforms from recreational waters.**Environment and Microbioogy**, (48),324-326.

Environmental Protection Agency (2005), **the Impact Beaches Project**: Result from a study on Microbiological Monitoring in Recreational Waters.U.S. EPA,office of Water,Health,and Ecological Criterion Division,Washington,DC.

Foundation for Environmental Education (2006), **Report of Award for Improving the Coastal Environment**, the Example of the Blue Flag, Copenhagen: Denmark.

Fischer,J. Khan,I.Tulika,k.and Njmai,R.(2009). Microeconomics of Competitiveness,**Jordan Tourism Cluster Report.**

Gibson, J. (1999), Legal and Regulatory Bodies: **Appropriateness to Integrated Coastal Zone Management Final Report,** European Commission, DG XI.D.2, 298 p.

Global Eco-labelling Network (2004), "Information Paper: Introduction to Ecolabelling", adopted from **http://www.gen.gr.jp/pdf/pub_pdf01.pdf**

Guidelines for Canadian Recreational Water Quality, (1992).published by authority of the Minister of National Health and Welfare, Ministry of Supply and Services: Canada.

Global Water Partnership (2000), **Integrated Water Resources Management.** Global Water Partnership, Technical Advisory Committee Background Paper 4.

Hulings,N. (1989).**A review of marine science research in the Gulf of Aqaba.** Amman,Jordan.University of Jordan Press.

International Union for the Conservation of Nature (IUCN), United Nations (1991).Caring for the Earth: **A strategy for Sustainable Living**. Geneva, Switzerland.

Irandu,E.(2004) ,The role of tourism in the conservation of cultural heritage in Kenya, **Journal of Asia and Pacific Tourism**, (42), 203–223.

ISO (1999), International Standard ISO 14024: **Environmental Labels and Declarations**. Principles and Procedures. International Organization for Standardization.

Jordanian Ministry of Environment (2009). Solid and Hazardous Waste Directorate. Adopted from **http://www.moenv.gov.jo/arabicmoe/users/index.aspx.**

Schmeer, K. (2005). Matrix and Mapping Stakeholder Influence **Management Decision**, 43 (5), 649-660.

Karmeed, E. (2005). Economic Valuation of Ecotourism of Coral Reefs along the Jordanian Coastline of Aqaba Gulf. **Unpublished Master Thesis**, University of Jordan, Amman, Jordan

Kay, D., Wyer, D., Crowther, J., Fewtrell, L. (1994). Faecal Indicator Impacts on Recreational Waters: budget studies and diffuse source modelling. **Journal of applied microbiology,** Symposium supplement, 85: 70S–82S.

Laine, A. and Kronholm, M. (2005). Bothnian Bay Life: Towards Integrated Coastal Zone Management, **Ocean and Coastal Management,** 83, 259-262.

Lunney, D. Pressey, B. Archer, M. and Curtin,A.(2005).Integrating ecology and economics: illustrating the need to resolve the conflicts of space and time, **Ecology and Economic,** 7(3), 63-74.

Michael, J. Mahony, L. And Condon, L. (2005), An Evaluation of Irish NON-Blue Flag Designated Bathing Areas: Implications for the Future Development of the Blue Flag Program In Ireland, **Environmental Education Report.**

Marine Science Station (MSS), (2004). Environmental Appraise of the Jordanian Coast of the Gulf of Aqaba, Red Sea, **Jordan's National Monitoring Program-Annual Report**

Mato, Y. Isobe, T. Takada, H. Kahnehiro, H. Ohtake, C. and Kaminuma, T. (2001), Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment, **Environmental Science journal** 13(8), 318-324.

Mediterranean Environmental Technical Assistance Program, (METAP) (1999), Draft project for the preparation of a National Strategy for Environmental Education, Awareness and Communication, Amman.

Ministry of Tourism and Antiquities, Retrieved August, 25, 2010 from **http://www.mota.gov.jo/Home/index.htm**

Mugglestone,M. Stutt E. and Rushton L. (2000) , A Review of the Health Effects of Sea Bathing Water. Institute for Environment and Health, Leicester, UK. from **http://www.le.ac.uk/ieh/webpub/webpub.html**

Nelson,C. Morgan,R. William,A. (2006), **Beach Awards and Management Report**, Ocean and Coastal Management 43(200),87-98.

Oksenberg, L. (1991). New Strategy for Presenting Survey Questions. **Journal of official statstics** 7(3), 349-365.

Petra News Agency,(2007), Amman, Jordan. Adopted from **http://easybids.info/2010/02/25/aqaba-the-capital-of-tourism-in-the-arab-world/**

Reiss, Z. and Hottinger, L. (1984).**The Gulf of Aqaba Ecological and Micropaleontology**. Berlin,Germany.Springe-Vrlag.

Sasidharan,V.(2002) Developing Countries and Tourism Ecolabels, **Tourism Management**.(23), 161-174.

Sharply, Richard (2000) Tourism and Sustainable Development, Exploring the theoretical Divide, **Journal of Sustainable Tourism**, 6(8), 35-50.

Stephen , Paul (2003).Tourism Management and Managing for Change. **Business and Economic**, 22(5), 370-381.

Surveysystem (2009). Retrieved September,3, 2010 from **http://www.surveysystem.com/sscalc.htm**

Teuten, E.Rowland, R.and Thompson, B. (2007), Potential for Plastics to Transport Hydrophobic Contaminants. **Environmental Science and Technology** 35: 318-324.

Tortell, Philip (2004), Seeking Common Approaches, **Jordan Report on ICZM Experiances**, Aqaba, Jordan.

UNEP (2005). Marine Litter. An analytical overview, 4, Retrieved November, 12, 2010 from **http://www.unep.org/regionalseas/Publications/Marine_Litter.pdf**

UNEP (2006). Opportunities and Challenges for coordination between Marine and Regional Fishery Bodies and Regional Seas Conventions. **Regional Seas Reports and Studies** .

UNEP(2007).Ecolabelling as Potential Marketing Tool for African Products, **An overview of opportunities and** challenges, (27),62-82.

United Nation Agency for International Development **(USAID) report**, (2009), Aqaba Tourism Marketing Strategy, 2010-2015, Aqaba, Jordan.

United Nation Agency for International Development **(USAID) report**, (2007), A Water Resource Planning Model for Aqaba , Aqaba,Jordan.

United Nations (2002), **Report of the World Summit on Sustainable Development**, (Publication Number A/CONF.199/20), New York: United Nations.

United Nations University International Leadership Institute, UNU ILI (2010), from **http://www.hakhosting.com/content.php?content=whatsnew& subcontent=whats_new_detail&objectId=81, last visited 09/03/2010.**

Verschuur, G. (1997),Transparency Measurement in Garner Lake, The Relationship between Secchi Depth and solar altitude and a suggestion for normalization of Secchi depth Data. Lake and Reservoirs Management. 13: 142-153.

World Health Organization, (2003). **Guidelines for safe recreational water environments**, Vol.12, 134-191.

World Health Organization , (2001). Health-based monitoring of recreational waters: the feasibility of a new approach (the "Annapolis Protocol"). Geneva, from **http://www.who.int/environmentalinformation/Informationresources/documents/Recreationalwaters/Annapolis.pdf**

Wielgus.J.(2003), Effect of Coral Reef Attribute Damage on Recreational Welfare. Haifa University, **Marine Resources Economics Report**.

Zei, E. Poel, M. and Bois, J. (1995),The Principal Components of Mixed Measurement Level Multivariate Data: Quantitative analysis of Qualitative Data. **Psychometrika**, 41, 505-528.

Annex

Annex A: Stakeholders Interview

INTEGRATED WATER RESOURCES MANAGEMENT
MASTER OF SCIENCE FOR ARAB AND GERMAN YOUNG PROFESSIONALS
IWRM

Stakeholders Interview

1- Name of interviewee.................. Date............................. Location..............................

2- When was the organisation/authority found?

....

3- How important are tourists for your organisation/authority? Do you take any measures to attract tourists?

....

4- What is your opinion about eco-labels in general?

....

5- Do you think eco-labels can contribute to the conservation of Aqaba Gulf natural resources?

....

6- Are you familiar with the Blue Flag Program, if yes what is your experience?

....

7-Does your organisation/authority supports the idea of Blue Flag program as eco-labels for Aqaba beaches? If yes, Explaine how?

....

7- Do you think it is necessary for the beaches at the Aqaba Gulf to have an eco-label?

....

8- How do you think your organisation would be involved in the Blue Flag Program?

....

9- Assuming the Coastline of Aqaba will continue to develop and lose more of its natural resources, do you this would affect the tourism market?

....

10- Does your authority/organisation take any management measure to conserve Aqaba marine environment? Explain? ....

11- Does your organisation/authority take any measures in terms of laws or regulations to reduce the pollution of the Aqaba Gulf? If yes, explain how? ....









Annex B: Tourist's Questionnaire (2 pages)



Questionnaire

Dear visitor/tourist, I am student of the master program "Integrated Water Resources Management for Arab and German Young Profesionals". I carry out investigations about the current situation of the beaches of the Gulf of Aqaba for my master´s thesis. I would be happy if you could support my work by answering the following questions:

Q1: Your home country______________ Age _________________ Sex ________________

Q2: For how long do you like to stay in Aqaba?

☐ 1-3 days ☐ 4-7 days ☐ more than one week

Q3: Do you prefer to spend your holidays on public or private beaches?

☐ public beaches ☐ private beaches

Q4: How would you rate the level of satisfaction with regard to private beaches in terms of :

1- Beach cleanliness (litter and waste)
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
2- Environmental Safety (safety equipments and first aid, supply of drinking water)
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
3- Cleanliness of water bathing areas (odour and colour)
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
4- Information about water quality, eco-systems and environment, including a beach map
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
5- Toilet and restroom facilites
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
6- Maintanance of buildings and equipment
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad
7- Eco-friendly transportation to the beach
   ☐ Excellent ☐ Very Good ☐ Good ☐ Adequate ☐ Bad









INTEGRATED WATER RESOURCES MANAGEMENT
MASTER OF SCIENCE FOR ARAB AND GERMAN YOUNG PROFESSIONALS
IWRM

Q5: Have you ever heard about the Blue Flag eco-label award for beaches ?

☐ Yes ☐ No

Q6:If yes, do you prefer to spend your holiday on blue flag beaches?

☐ Yes ☐ No

Q7: Are you willing to support the conservation of Aqaba Gulf by paying an Eco-tax per day which will be used for environmental protection / projects?

☐ Yes ☐ No

Q8: If yes, how much are you willing to pay per day?

☐ ≤ 1 $ ☐ >1-2 $ ☐ >2-3$ ☐ >3-5 $ ☐ >5 $

Thank you very much for your support!









Annex C: Detailed Checklist for Proposed Applying Beaches (8 pages)

Checklist for Applying Beaches

1. INFORMATION ABOUT THE APPLYING BLUE FLAG BEACH:

-Beach name……………………………………………………………………………

- How long is the beach………………………………………………
- Name of beach operator that responsible for the beach management…………………
- Address……………………………………………………………………………

2. ENVIRONMENTAL EDUCATION AND INFORMATION

2.1 Information about the Blue Flag Program must be displayed

- Is the information about the Blue Flag Program displayed at the beach information board?

Yes: ☐ No: ☐

- Is the information also posted elsewhere?

☐ Lifeguard stations ☐ Parking areas ☐ Tourism office ☐Other beach facilities

2.2 Environmental education activities must be offered and promoted to beach users

- How many environmental education/information/training projects or activities have been planned for the coming Blue Flag season? ....
- Please indicate which persons, groups and/or organizations are involved in making these projects or activities ……………………………………………….
- Please provide the following information for each of the five activities:

a) The name of the activity…………………………………………………

b) The goal of the activity……………………………………………………

c) Targeting group……………………………………………………………

d) The contents/message of the activity…………………………………….

- Is the information about the activities posted on the beach information board?

Yes: ☐ No: ☐

2.3 Information on bathing water quality must be displayed

-Is updated information about bathing water quality displayed at the beach information board?

Yes: ☐ No: ☐

- Is the information also posted elsewhere? Yes: ☐ No: ☐

If yes, where?

…………………………………………………………………..

2.4 Information relating to local eco-systems and environmental phenomena must be displayed

- Are there any natural sensitive areas or valuable cultural sites in the coastal zone?

Yes: ☐ No: ☐

If yes, do you display information about these areas at the beach information board?

Yes: ☐ No: ☐

2.5 map of the beach indicating different facilities must be displayed

- Is a map of the beach indicating facilities displayed on the beach information board?

Yes: ☐ No: ☐

- Does the map show the listed locations in the blue flag criteria?

Yes: ☐ No:☐

3. Water Quality

3.1 The beach must fully comply with the water quality sampling and frequency requirements

- Have the samples been taken according to the frequency requirements?

Yes: ☐ No:☐

-Have the samples been taken according to the sampling requirements?

Yes: ☐ No:☐

If yes, do the sampling records affect any of the bathing water quality? Yes: ☐ No: ☐

If yes, why? ……………………………………………………………….

3.2 The beach must fully comply with the standards and requirements for water quality analysis

- How many sampling sites does the beach have?

- Is an independent person officially authorized/ trained for collecting the samples?

Yes: ☐ No:☐

3.3 No industrial, wastewater or sewage-related discharges should affect the beach area

- Are there any discharges of urban or industrial waste water to the beach?
Yes: ☐ No:☐

- Are there any industrial facilities or plants in the vicinity that could potentially have an influence on the surrounding coastal environment? Yes: ☐ No: ☐

If yes, please describe the facilities and their potential effects………………………………………………

- Is there any untreated waste water released anywhere in the community?

Yes ☐ No: ☐

If yes, specify source, release and approximate number of untreated releases……………………………

3.4 The beach must fully comply with the Blue Flag requirements for the microbiological parameters fecal coli bacteria (E.coli) and fecal Enterococci / Streptococci.

- Do the samples meet the required limit values for E.coli?

Yes: ☐ No: ☐

- Do the samples meet the required limit values for fecal Enterococci?

Yes: ☐ No: ☐

3.5 The beach must fully comply with the Blue Flag requirements for the physical-chemical parameters.

- Is the beach monitored for the physical-chemical parameters in terms of the following parameters? PH value, oils, floatable, transparency, color, surface active substances and phenols?
Yes: ☐ No: ☐

4. ENVIRONMENTAL MANAGEMENT

4.1 The local authority or beach operator should establish a beach management committee

- Please list the beach management committee members and their affiliations (i.e. beach manager, lifeguard, education expert, special user group, special interest group)

………………………………………………………………………………………………

……………………………………………………………………………………………

4.2 The local authority or beach operator must comply with all regulations affecting the location and operation of the beach

- Is there a land use and development plan for the coastal zone?

Yes: ☐ No:☐

4.3 The beach must be clean

- Does the beach comply with national guidelines concerning litter?

Yes: ☐ No:☐

- Is the beach, surrounding area, paths, parking areas and access points to the beach clean and maintained at all times? Yes: ☐ No:☐

- How often is it cleaned? ....

- By what methods is it cleaned? ....

4.4 Algae vegetation or other natural debris should be left to decay on the beach

- Is algae or other vegetation present on the beach?
Yes: ☐ No: ☐

- Is the removed algae or vegetation disposed in an environmentally friendly way?

Yes: ☐ No:☐

-Please describe how it is disposed of………………………………………………

4.5 Waste disposal bins/containers must be available on/by the beach in adequate numbers and they must be regularly maintained

- Are there enough litter bins on the beach (or larger receptacles at the beach access points) and are they well secured, maintained and spaced appropriately?
Yes: ☐ No: ☐

- How often are the litter bins emptied during peak season?

Times per week……………………………….

- Does your litter go to an approved disposal site? Yes: ☐ No: ☐

Where? ....

4.6 Facilities for the separation of recyclable waste materials should be available at the beach

- Is there a local/municipal recycling program or facilities? Yes: ☐ No:☐

4.7 Toilet or restroom facilities must have controlled sewage disposal

-Please specify type of sewage disposal from the toilets and other sanitary wastewater?

4.8 On the beach there should be no unauthorized camping or driving and no dumping

- Is driving permitted on the beach? Yes: ☐ No:☐

If yes, how is it regulated? ....

- Is camping allowed on the beach? Yes: ☐ No:☐

If yes, is this taking place in areas specifically zoned for this use and load capacity? Describe please…………………………………………………………

- Is there any unauthorized camping, driving or dumping on the beach?

Yes: ☐ No:☐

- Are there any beach events involving the use of vehicles or camping being held on the beach?

Yes: ☐ No:☐

- Is there parking for emergency vehicles in to the beach?

Yes: ☐ No:☐

4.9 Access to the beach by dogs and other domestic animals on the beach must be strictly controlled

- Are there national laws or local bye-laws concerning animals on the beach?

Yes: ☐ No:☐

Are domestic animals allowed on the beach?

Yes: ☐ No:☐

If yes, please describe the measures taken to ensure that no fecal matter contaminates the beach

……………………………………………………………………………………………
…………………………………………………………………………………….

4.10 All buildings and beach equipment must be properly maintained

- Are all buildings and equipment on the beach properly maintained?

Yes: ☐ No:☐

- Are environmentally friendly products used to maintain the buildings/equipment?
Yes: ☐ No:☐

4.11 Coral reefs in the vicinity of the beach must be monitored

- Is there a coral reef located within 500 meters from any part of the beach?

Yes: ☐ No:☐

4.12 An adequate number of toilet or restroom facilities must be provided

- Are there adequate sanitary facilities for the peak number of users?

Yes: ☐ No:☐

- Are they equipped with a washbasin, soap and clean towels or a dryer?

Yes: ☐ No:☐

4.13 Toilet or restroom facilities must be kept clean

- Are the sanitary facilities kept clean at all times?

Yes: ☐ No:☐

- How often are they cleaned?

Yes: ☐ No:☐

5. SAFETY AND SERVICES

5.1 An adequate number of lifeguards and/or lifesaving equipment must be available at the beach

- Are there beach guards on duty on your beach during the bathing season?

Yes: ☐ No:☐

- Do the lifeguards have a national/international certification?

Yes ☐ No:☐

Do the lifeguards wear an easily identifiable uniform?

Yes: ☐ No:☐

- Is there adequate public lifesaving equipment?

Yes: ☐ No:☐

5.2 First aid equipment must be available on the beach

- Is first aid available on the beach?

Yes: ☐ No:☐

-Is the location of the first aid marked on the beach information board?

Yes: ☐ No:☐

5.3 Emergency plans to cope with pollution safety risks must be in place

- Is the community part of a local and/or regional emergency plan to cope with pollution accidents?

Yes: ☐ No:☐

- Is this plan in compliance with other national emergency legislation for the area?

Yes: ☐ No:☐

- Does the emergency plan include a scheme to secure that the public is informed about pollution accidents?

Yes: ☐ No:☐

- Does the emergency plan cover clean-up operation?

Yes: ☐ No:☐

- Are emergency phone numbers available at the information board?

Yes: ☐ No:☐

5.4 There must be management of different users and uses of the beach so as to prevent conflicts and accidents

- Are there overlapping needs among beach user groups in the beach area (e.g. water sport users and swimmers, etc.)? Yes: ☐ No:☐

If yes, please detail the overlap and how conflict is avoided……………………………………………

5.5 There must be safety measures in place to protect the users of the beach

- Is there access to the beach for the general public?
Yes: ☐ No:☐

- Is there a source of drinking water?

Yes: ☐ No:☐

5.6 A supply of potable drinking water should be available on the beach

If yes, how is it protected from animals……………………………

5.7 At least one Blue Flag beach in each municipality must have access and facilities provided for the physically disabled

- Does this beach have access for disabled people?

Yes: ☐ No:☐

- Does this beach have toilet facilities for disabled people?

Yes: ☐ No:☐

- Number of toilets for disabled people? ....

- If there are no Blue Flag beaches in the municipality with facilities for disabled people, please describe why not?

……………………………………………………………………………………..

- Does the access and toilet facilities for disabled people comply with national/international standards?

Yes: ☐ No:☐

Annex D: Beach Sampling Form

Beach Sampling Form

Adopted by ASEZA

Number/Code of Sample..

Sampling Location..

Sampler's Name...

Time of Sampling...

Time Delivered to Lab...

Date...

1-Weather Conditions

☐ Rainy ☐ Cloudy ☐ Sunny ☐ Windy

2- Wind Direction

☐ Northern ☐ Southern ☐ Eastern ☐ Western ☐ Other...............................

3- Water Color and Turbidity

☐ Clear ☐ Milky ☐ Dirty ☐ Other...

4- Water Temperature..

5- Cleanliness of the Beach

☐ Clean ☐ Adequate ☐ Dirty ☐ Other...

6- Oil and/or Floatable Residues Present

☐ Yes ☐ No If Yes, Describe...

7- Activities on the Beach

☐ Camping ☐ Bathing or Diving ☐ Other..

8- Odors

☐ Neutral ☐ Slight ☐ Strong ☐ Other..

7- Estimated Bather Density

☐ 1-10 ☐ 11-20 ☐ 21-50 ☐ >51 ☐ Other.............................

تقديم العلم الأزرق البيئي كأداة للحفاظ على البيئة الساحلية من الأنشطة البشرية في خليج العقبة

إعداد
هتاف ياسين

المشرف
الدكتورة أروى حمايدة

المشرف المشارك
الدكتور أودو نيهرن

ملخص

يشهد ساحل العقبة نموا" اقتصاديا متزايدا" و خاصة في قطاع السياحة. يؤثر هذا النمو على البيئة مما يدعو إلى الإهتمام بالإدارة المتكاملة للبيئة الساحلية. برنامج العلم الأزرق برعاية المؤسسة الدولية للتعليم البيئي وهي مؤسسة غير حكومية و غير ربحية تمنح جائزة دولية للشواطئ و المراسي.

يهدف البرنامج إلى تحقيق التنمية المستدامة في المناطق الساحلية من خلال معايير محددة تشمل نوعية المياه و التعليم البيئي و الإدارة البيئية و السلامة و الخدمات.

تهدف هذه الدراسة إلى طرح فكرة برنامج العلم الأزرق للأردن و معرفة مدى تطبيقه من خلال معرفة الأطراف المعنية في حال تطبيق البرنامج بالإضافة إلى تقييم معايير البيئة الأردنية و المحلية وذلك بأخذ شاطئين عام و خاص لمطابقة معايير البرنامج و خاصة فيما يتعلق بنوعية المياه.

للحصول على المعلومات من الأطراف المعنية تم إجراء مقابلات بالإضافة إلى الزيارات الميدانية للشواطئ الخاصة في فنادق خمس نجوم و تم تحليل الإستبيان من خلال برنامج (SPSS).

تبين من الدراسة أن ظروف الشواطئ الخاصة أفضل بكثير من الشواطئ العامة. أبرز محدد للشواطئ العامة يرجع إلى التمويل المادي. يمكن خفض التكلفة المادية بمراجعة الفحوصات اللازمة و عدم إضافة فحوصات غير ضرورية.و بناء عليه تم اقتراح " نموذج للعينات" كوسيلة لتقليل تكلفة العينات و مراقبة عينات مياه البحر.

تم قبول هذا النموذج من قبل سلطة منطقة العبة الإقتصادية الخاصة .

تضمنت نتائج الإستبيان أن العلامة البيئية تجذب السياح. معظم السياح الذين تم استجوابهم فضلوا الشواطئ ذات العلامة البيئية عن الشواطئ التقليدية بالإضافة أن غالبية السياح في الشواطئ الخاصة على استعداد لدفع ضريبة بيئية بمعدل يومي.

توصي الدراسة باستثمار الضريبة البيئية في حال تطبيقها لدعم الشواطئ العامة لتتمكن من تطبيق البرنامج.